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# ATHLETIC TRAINING

MICHAEL C. MURPHY.

# ATHLETIC TRAINING

BY

MICHAEL C. MURPHY

EDITED BY

EDWARD R. BUSHNELL

WITH AN INTRODUCTION BY

R. TAIT McKENZIE

PROFESSOR OF PHYSICAL EDUCATION, UNIVERSITY OF PENNSYLVANIA

ILLUSTRATED

NEW YORK
CHARLES SCRIBNER'S SONS
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## PREFACE

THE following pages constitute the legacy which Michael C. Murphy has left to the boys and young men of America, and, indeed, to the whole athletic world. They contain the results of thirty years spent in the development of track and field athletics as a science. Because of his wonderful success in turning out intercollegiate, Olympic, and world's champions, he was always recognized, even by his rival coaches, as the dean of his profession. He entered the profession at a time when the training of athletes was not recognized as a science, but he devoted to it a keen understanding of human nature and a rare genius for discovering new and improving old methods of promoting athletic efficiency. At the time of his death, on June 5, 1913, he was rightfully credited, both in this country and in Europe, with having made the most important contribution to a science which has



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produced a cleaner, sturdier, and more intelligent manhood wherever amateur athletics have been fostered.

Mr. Murphy began the preparation of this text shortly after his return from the London Olympiad in 1908. He wanted this to be the most comprehensive book for the guidance of athletes, and to include all the information he had obtained in the course of his career as an athlete, coach, and observer. He wanted it to be of lasting benefit to the boys and young men of his native land, and to that end he worked as industriously on the manuscript as his failing health would permit, rewriting and revising it from time to time. The manuscript was finally completed in the early spring of 1913, during his last illness. Fearing that he might never live to see the book published, he finished the dictation from his sick-bed, and the editor has completed the revision of the text in accordance with his suggestions made from time to time during the last four years.

Mr. Murphy drifted into athletics before he was twenty years of age. He was a sprinter, and a good one, but in athletic

the development of this country was then in its infancy. Mr. Murphy diverted his attention from his own athletics to the study of how to make champion athletes of his fellows, and to them he imparted the results of his own experiments and observations. He once described this to the writer in the following words:

"When I was a sprinter every fellow trained himself. Being of an observant disposition, I tried to learn all I could from watching others. I tried to avoid their mistakes and to profit by the good features of their training. Then I began to make an independent study of all forms of track and field athletics. I wanted to know what kind of food was best for the athlete, how much work he should do to get the maximum speed if he were a runner, and how to add a few inches to his jumps or weight throwing. As a result of these experiments, which I made upon myself and the athletes I trained, I found what I considered the best diet for an athlete, the principles of massaging the muscles, bathing, and, in fact, the whole scheme of fitting a man for a particular competition. After twenty-five years'

experience as coach a man is bound to have handled a great many athletes. My present system of training boys and young men is the result of what I learned in this way during my lifetime."

The foregoing statement admirably explains Mr. Murphy's method of work. He made the most exhaustive study of every event on the track and field programme. Being gifted with a rare understanding of human nature, he had a wonderful influence over every boy he trained. He was constantly on the outlook to discover some new method or device which would add to the skill of the human body.

This relentless search for knowledge led him to take a two-years course in medicine and surgery at the University of Pennsylvania when he trained the athletes of that institution. More than one physician has testified to the fact that Mr. Murphy knew the human body, its possibilities and needs, as well as they themselves. Although his knowledge ranged from track athletics to all kinds of sports, including football and baseball, his best efforts were shown in the de-

velopment of sprinters, hurdlers, and jumpers. In all of these events his ideas were years ahead of his rivals, and they put America correspondingly ahead of other nations. That he was particularly skilful with sprinters was best illustrated by his discovery of the crouching start, which was only one example of his inventiveness. He had experimented with it on himself several years before he taught it to Sherrill, of Yale, who first used it in an intercollegiate meet. This discovery was due to Mr. Murphy's persistent search for some method to reduce, by even the fraction of a second, a sprinter's time for 100 yards. This persistent search for new methods was largely responsible also for the development of John Owen, the first man who ever ran 100 yards in 9⅘ seconds; Henry Jewett, of Detroit; B. J. Wefers, of the New York Athletic Club, the first man to run 220 yards in 21⅕ seconds; and, finally, of Donald F. Lippincott, who at Stockholm, in 1912, established the present world's record of 10⅘ seconds for 100 metres.

What he did with the sprints he duplicated in nearly every event on the athletic pro-

gramme, and he was responsible for the development of more world's champions than all other American trainers combined. It was the reputation Mr. Murphy made locally by putting his new ideas into practice that led Yale to engage him as track and field coach in 1887. He instantly made Yale athletes famous, although for the next six years he divided his time between that university and the Detroit Athletic Club. In Detroit he developed the wonderful Jewett and Owen. His best work, however, was done as the coach of college teams. Of the twenty-one teams coached by him at Yale and Pennsylvania since 1893, his men won the intercollegiate championship fifteen times. Seven of these victories were with Yale and eight with Pennsylvania. Of the six times that his teams failed to win they were second four times, third once, and fourth once.

His career in the field of international athletics was even more remarkable. In 1895, when the first international meet between the New York Athletic Club and the London Athletic Club was held in this country, Murphy was selected as trainer. This meet brought

out such wonderful champions as M. F. Sweeney, who made his world's record of 6 feet 5⅝ inches at this meet; C. J. Kilpatrick, who made a record of 1.53⅘ for the half-mile; and T. P. Conneff, who, under Murphy's training, later made a world's record of 4.15⅘ for the mile, which stood until 1911, when J. P. Jones, of Cornell, reduced it by one-fifth of a second.

During his connection with the New York Athletic Club, where he coached in the summer months, he developed such world's champion sprinters as B. J. Wefers, the first college man who ever ran 100 yards in 9⅘ seconds, and the first to make the present world's record of 21⅕ seconds for 220 yards. He also trained M. W. Long, who still holds the world's record of 47 seconds for 440 yards. Indeed, there is hardly an event on the athletic programme in which Murphy did not develop champions. In 1900 he took the University of Pennsylvania and the New York Athletic Club teams to the Olympic games at Paris. In these games, in which America completely outscored the field, the athletes trained by Murphy carried off nearly all the honors.

It was not until 1908 that the United States

was represented at the Olympic games by a single team which could be accepted as the pick of this country. That year, for the first time, the American Olympic Committee held a series of try-outs in three sections of the country, and with these performances as a guide selected a team of more than one hundred athletes. All the men thus selected were taken to London under the direction of the American committee; but the selection of the team was only part of their task. There still remained the bigger job of conditioning all these men, a task the difficulty of which was greatly increased by the sea voyage and the change to another climate. For this the American committee unanimously selected Mr. Murphy. What they thought of him was illustrated by the remark of James E. Sullivan, the American commissioner, when, at the conclusion of the conference, he was asked who nominated Murphy and if any one else had been considered.

"When we came to select the coach," said Mr. Sullivan, "Murphy's name was on every one's tongue. We didn't even think of any one else."

Murphy was selected for this position for a number of reasons, but primarily because he was the foremost authority of the world on all kinds of athletic training. In addition to this skill he had a most unusual knowledge of human nature. Every one knows that in a team of one hundred champion athletes there are more curious dispositions collected than could be found in any body of men of equal size. To command the respect of so many athletes, many of whom had worked with other trainers, to keep them all in good humor, and to have the maximum number on edge for their particular events required a genius. Murphy was equal to the task. What he accomplished at London in 1908 is now history, but in every particular he more than made good.

When the American Olympic Committee set about the selection of a coach for the 1912 team Mr. Murphy was a sick man, but the committee unanimously chose him for the position again. Had it not been for the pressure brought to bear upon him and the hope that the trip would benefit his health, he would have declined the position. He under-

took his work suffering from ill health, but stuck to it doggedly to the end, and his genius for conditioning men, and for communicating to them his own indomitable spirit, resulted in a record even better than that made in 1908. When the Olympic Committee met in 1913 to plan for the 1916 Olympiad it sent a telegram to the veteran trainer, then in his last illness, acquainting him with their action in unanimously appointing him to coach the 1916 team.

He will do no more coaching in person; but this book, which contains the fundamental principles of correct training for every athletic event, and for the building up of strong bodies, will help thousands of boys and young men who never came in touch with his magnetic personality.

The editor wishes to acknowledge his indebtedness to Dr. R. Tait McKenzie, head of the Department of Physical Education at the University of Pennsylvania, and to Mr. M. F. Sweeney, Director of Athletics at The Hill School, for their assistance in the final reading of the proof for the elimination of any technical errors which might have crept into

the text, due to the inability of Mr. Murphy to personally read the text after it had been set up in type.

EDWARD R. BUSHNELL.

*November*, 1913.

## AUTHOR'S INTRODUCTION

For thirty years I have been intimately associated with the development of track and field athletics in the United States. Most of that time has been devoted to training athletes at Yale and the University of Pennsylvania, varied with a few years and several summer seasons spent in occupying similar positions with athletic clubs. During my connection with athletics, first as a sprinter and then as a coach, tremendous changes have taken place in these sports. The system I have taught has been developed by the experiments I have made upon myself, the experiences of the athletes I have trained, my observation of athletics in various European countries, and the results achieved by my associates in this country. It was in the hope that the science of athletics, which has grown up during my lifetime, might be of some help to the youth of this

and other countries that I began, four years ago, the preparation of this text. No man knows all there is to know about any given subject, and I freely acknowledge my indebtedness to many of the athletes whom I have trained and to my associates in this work both here and abroad.

I believe with all my soul in the great value of athletics in the life of the individual and the nation. I believe that every boy and every girl have a right to a good constitution. If they have not been blessed with such by birth, then I contend that it is the duty of the state, as a part of its educational system, to give these children facilities for acquiring strong bodies. This is a doctrine I have preached incessantly for years, and I rejoice to see that our colleges and our public and private schools are furnishing just these facilities. I never did believe in athletics except as they promoted good health and physical efficiency. This is the one truth I have always emphasized—that all the athletic glory ever won is not worth a month's ill health.

I could write a volume on the value of athletics to the individual—the moral and

physical good it does—but these are lessons which the American people have already learned. My purpose in writing this book is to supply a text-book for the guidance of the boys and young men of this country who wish to achieve health and success in athletics.

This book was written primarily for the benefit of those who have not the advantage of professional coaches. Not many schools and small colleges are able to employ competent coaches, while the vast majority of the boys and young men who compose the membership of the hundreds of athletic clubs which are being formed everywhere are totally without the right kind of instruction. In this book I have devoted proportionate attention to all the events which are on the Olympic, collegiate, and club programmes. They have been so arranged that any boy or young man who makes a careful study of the event in which he wishes to excel can master it without the aid of a coach. No two boys are alike, and so my readers must use common sense in applying these lessons.

It will be noticed that in discussing nearly

every event I am assuming that the athlete will have from eight to ten weeks in which to train. For instance, if the athlete be a schoolboy he will find it possible to prepare for any given event in this time. Severe training for a longer time than this is likely to result in failure. No person should train severely for a longer period than this. It will frequently happen that an athlete desires to keep in training for various meets during the greater part of a year. While I should strongly caution him to be careful not to overdo it, he will find that after he has once gotten into good physical condition he will be able to enjoy periods of rest from training and competition, and then be able to get himself back into good physical condition in half the time usually required.

The average boy likes to be athletic. He wants to have a strong, well-developed body, and to excel in some particular sport, whether it be baseball, football, or track athletics. But on account of the great interest in athletics throughout this country, and the wide publicity which is given to all kinds of athletic performances, there is always the dan-

ger that young boys especially will have a tendency to overdo things, to overtax their strength. I have continually been asked by parents and teachers in the lower grades just how much and how severe athletic competition they should allow a growing boy. This is not an easy question to answer. The ideal way for boys under sixteen years of age is to "play at athletics," and I have never encouraged boys under this age to train for any athletic competition as one generally understands training. I do not mean that a boy under sixteen years of age should not compete in track and field events. Such competition will do him no harm, if he is careful not to run too great a distance or engage in other competition of a severe nature. A boy twelve years old or less should not be allowed to run more than 220 yards, and that not very often. A boy fourteen or fifteen years of age may run a quarter of a mile on a cinder track, or he may run twice this distance on turf. I say this, not to discourage boys from being athletic, but that their parents and teachers may be sensible in controlling their athletics so that they will run no risks of injuring

themselves. After a boy is sixteen years old he will know what he is capable of doing, though even here one must be always on guard against the tendency to train too hard. Not only will such a policy insure better health, but it will insure a greater measure of success in competitive athletics. It has been my experience that of the men I have trained the great majority of those who became intercollegiate, Olympic, and world's champions were those who began their serious training for athletic competition at about the eighteenth year. Practically all the men who suffer breakdowns have only their early athletic excesses to blame. Therefore, while I strongly favor all kinds of athletic sports for boys from ten to sixteen years of age, I want to caution them that this is the most important period in their attainment of physical strength and that health and a good physique are essential to their later athletic successes. The exercise of care and common sense during this period of their life will bring its own reward in after life.

M. C. MURPHY.

*May*, 1913.

# INTRODUCTION

THE editor's request for a word of introduction to this book gives me an occasion of which I gladly avail myself to put in words my appreciation of the wide influence for good of one the crowning years of whose career I have had unusual opportunities of observing.

I have frequently been asked to account for the great success of the American teams in the world-wide competition of the modern revival of the Olympic games. After speaking of the great public-school athletic leagues, with their thousands of schoolboy athletes, the supervised playgrounds dotted over every large city, and the schools and colleges, each with its department of physical education applying more or less closely to the entire student body, I must finally conclude that that success is due to the appreciation and the study of running, jumping, and throwing weights as

arts—arts of which the author of this book was a close student and a past master. No school or college in the United States of America is now considered complete without its gymnasium, playgrounds, and instruction in physical exercise. Practical knowledge of track and field athletics is within the reach of all, and the very publicity of the great athletic games draws to physical exercise the attention of those who would otherwise be too dull or too preoccupied to see its value.

Athletic sports have a peculiar value to the young. They are what remain of the natural and instinctive movements of self-preservation by fighting or flight that have been made part of our nature by constant practice from prehistoric times. The survival of the cave man was determined by his ability to run fast, to leap far, and to throw straight, and we are apt to forget the value in modern life of the quick eye, the steady nerve, and the firm hand. By them the otherwise inevitable collision is avoided. Every man of forty can recall hundreds of experiences of his own in which a sprain, a fracture, or even death itself has been averted by pres-

ence of mind and a quick, accurate movement.

Athletics are the best possible training for these qualities, valuable to-day as they ever were. Their practice on the outdoor track and field give them an overwhelming advantage over exercise taken indoors, and the rules and ethics of competition present a constant opportunity to fill the receptive mind of the boy with consideration for a fallen opponent, to impress him with the disgrace of whining under defeat, to give him that frank and modest acceptance of victory or defeat characteristic of the true sportsman who loves the game above the prize and the generous rivalry of the contest rather than victory alone.

The athletic field has been a great training-ground for youthful manners and morals because their sports so vitally interest the boys who haunt it. The athletic trainer is one of the few teachers to whom the instinct for hero-worship turns, and his influence for either good or evil can scarcely be exaggerated. He is the man who sets the standard and gives to boys their ideals of fair play and

sportsmanlike conduct that will be carried later into business, professional, and political life. His responsibilities are great and his personality should be above reproach, and the parents and educationalists should keep this in mind when they select those in whose care their boys are placed.

The national conscience is but the sum of that of its citizens, and from the value of athletics to a nation it is but a step to their international importance. The place of the great Greek athletic festivals in promoting peace throughout the ancient world has been the text on which the modern Olympic idea has been preached, and in their short history organized track and field athletics have been introduced and have become general in lands which have until recently treated them with absolute neglect and contempt. Each Olympiad shows a better understanding of the principles of sportsmanship by more nations, and the pioneer work of Baron de Coubertin and his associates on the Olympic Committee is increasingly evident in the more intelligent interest in sport all over the world.

We are fortunate in having the technic

of track and field athletics so clearly described in this book by one whose name is connected with the rise and growth of athletic competition in America during the thirty years spanned by his active life. He saw the foundation of the great American athletic clubs. He taught track athletics and football at Yale and at the University of Pennsylvania, and from the crude beginnings of thirty years ago he collected the traditions as they passed from athlete to athlete, and devised new and valuable methods which he tested and proved in his daily work.

Michael C. Murphy, or, as his friends affectionately called him, "Mike," was a man of unusual personality. Hundreds of amateur athletes, from last year's college graduate to the man whose hair is silvered, can recall stories of things he said or did. Anecdotes of men like Jewett, Owen, Kraenzlein, Orton, Sherrill, Shevlin, and Tewkesbury he continually used, to illustrate some point he wished to make to his pupil. He was quick to recognize athletic ability in a beginner, and had the connoisseur's admiration and apprecia-

tion of muscular intelligence, and especially of that inherent vitality and ruggedness which he so sadly missed in his own person. With one possessing these qualities he would take infinite pains, counselling and advising, jollying, bullying, or ridiculing him, as the temperament of the athlete seemed to require, for with him the merely "good" was ever the enemy of the "best." No one could read character so well or apply prescription so well. He knew the value of sympathy. The hand laid on the shoulder of the discouraged loser, and the voice choked with real feeling, went far to bind to him every man who had been his pupil in victory or defeat.

Small and slight in body, his courage was gigantic. Nothing daunted him. His positive manner and assumption of infallibility were the chief sources of power to him. He could impart to others that invincible courage and dogged determination that he himself used in his struggle against a delicate constitution and increasing infirmities.

He had a confident belief in the value to health of athletic exercises, and if he was occupied with the training and preparation of

those more gifted ones who bore the colors of their clubs, colleges, or native land in athletic competition, he still realized the value of less strenuous forms of exercise to those whose physiques were cast in less heroic mould. At Pennsylvania he adapted himself to the scholarship standard required of athletes and was most strenuous in requiring students under his care to live up to it. During the last ten years, when his health was beginning to fail, his reputation as a trainer at Yale and Pennsylvania and for the last two American Olympic teams reached its height. When the question of a trainer for the 1916 Olympic team was raised, the committee with one voice appointed him, although his health was visibly broken, a compliment which he understood and keenly appreciated.

The following pages were written either by his own hand or dictated by him substantially as they stand, and many of his former pupils and friends will recognize in them the terse, epigrammatic style of the man. One cannot give too much credit to Mr. Bushnell for practically forcing him to put down his ideas from time to time and also for arranging

and editing the entire book. It is but one more example of the affection which his magnetic personality inspired.

R. TAIT MCKENZIE, M.D.,
*Professor of Physical Education, Director of the Department of Physical Education, University of Pennsylvania.*

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# ATHLETIC TRAINING

# CHAPTER I

## PHYSICAL CONDITION

Good physical condition is something which every person, whether an athlete or not, should seek, and if the directions given in this chapter and throughout the book are followed they will greatly improve the condition and increase the vitality of every one who observes them. By physical condition I mean the building up of a state of bodily strength in which every organ is healthy and subject to the control and direction of the mind and will. This is a condition which results from the gradual development, through exercise, of the entire body.

When one first begins systematic training and exercise everything he does seems like so much hard work, but persistence will be rewarded first with a glow of increased strength and vitality, and then with a consciousness

of increased cleverness and ability in the particular event for which one is training. Finally, the athlete will obtain what I call "reflex physical action." This is nothing more nor less than doing in the most efficient manner the thing for which the athlete has been training—securing the maximum result with the minimum expenditure of effort. It means a co-ordination of the eye, the mind, and the body. A clever boxer in action illustrates what I mean. Every motion of his body, every step he takes, and every blow he aims are executed with the minimum expenditure of energy, yet it is all done unconsciously. Some persons are by nature clever physically, but exercise and training will give cleverness to the awkward man and make the clever one more skilful.

What I have said in the foregoing paragraphs may sound a little scientific or psychological, but it will bear close study, and after the athlete has followed a course of training in any of the events described in this book he will profit if he returns to this chapter and studies once more what I have said about physical condition.

In addition to the technical training, which I shall describe at length in the various chapters, there are certain requisites of good physical condition common to every person who aspires to become athletic. Of prime importance, I should name cleanliness. A clean, healthy body is the first essential to becoming a good athlete. I am, therefore, a firm believer in the health-giving properties of the early morning bath, followed by a vigorous rub-down, deep breathing, and a few simple calisthenic exercises. The best morning bath is a shower, but the majority of my readers will not have facilities for it. A tub bath is virtually as good, and if that is not possible either then practically the same results can be obtained by a sponge bath with a bowl.

If the athlete can take a cold bath, so much the better, but if that has a bad reaction upon his system the chill should first be taken off the water. The bather can tell for himself which is better. If after the cold bath he experiences a warm glow he need have no fear of its ill effects, but if he is inclined to be anemic and the bath leaves him uncomfort-

ably chilled he will do well to use warmer water. A few experiments will show him what temperature is best. A cold bath is well in cold weather, but in the summer it should be taken a little warmer or its after effects will be heating instead of cooling. One should be careful not to remain under a shower or in a tub too long. Two minutes under a shower is long enough for any one, and less time is better. One should never lie too long in a bathtub of warm water unless the temperature of the room is right, for there is nothing more weakening to the system.

The bath should be followed by a vigorous rub-down. Many persons have the idea that they cannot rub themselves, but this is a mistake, for one can really do this better than another can do it for him. After the body has been dried thoroughly the massage should begin with the feet, and every part of the body should be vigorously rubbed, at least five minutes being taken for the operation. The massage movement is very simple and consists merely of rubbing the hands vigorously over the skin with a circular motion. The

back can be rubbed as well as the legs and arms by using a rough towel and drawing it back and forth vigorously. This sort of a rub-down will be a splendid tonic for the skin, and at its conclusion the body will glow from the blood flowing to every part as nature intended it should.

After this performance the physical condition will be greatly benefited by a few minutes spent in deep-breathing exercises. The breath should be inhaled slowly until the lungs are completely filled. Then the breath should be released in the same gradual manner. This may be repeated for two or three minutes, after which it may be followed to advantage by some simple calisthenic exercises for the arms, the back, and the abdomen. These exercises are invaluable, but to get their fullest advantage they should be taken in a room thoroughly aired or near an open window.

All the exercises I have explained, including the bath, rub-down, deep breathing, and simple calisthenics, can be finished without hurrying in fifteen minutes. If they are started early enough in life and pursued per-

sistently they will give one the most perfect protection that can be devised against colds and illnesses of all kinds. Any person ought to be ashamed to advance the plea that he has not enough time to take these exercises. If he is pressed for time let him get up fifteen minutes ahead of his usual schedule. That quarter of an hour, employed as I have suggested, will be worth several hours employed in any other manner, to say nothing of the money it will save in doctor's bills.

On the subject of calisthenic exercises, athletes who are training for any of the track events will do well to practise an exercise made popular by W. G. George, holder of the world's professional record of 4.12¾ for the mile run. The exercise is very simple and can be practised in the bedroom. It consists in the athlete's dancing up and down on the toes in such a manner as to bring into play the same muscles that are used in running. To learn the exercise the athlete should alternate in raising each leg so that the knee will come to about the same level as the hips, no higher. The left hand should swing forward in harmony with the raising of the right

*From a photograph taken on board S. S. Finland, en route to Olympic Games, Stockholm, 1912.*

TRAINING BY DANCING.

Davenport, Belote, and Lindberg, Chicago A. A., illustrating method of getting into good condition by dancing on mat.

leg, just as in walking. Unless one has got into pretty good physical condition by considerable track work, this exercise should be taken easily at first because it is practically the same as running. After having mastered it the athlete can practise it rapidly and get the same exercise, in accordance with the length of time he practises it, as he would by an actual run on the track. This is an exercise which I have used with great success for my track athletes during the winter months when it was impossible to run out-of-doors. I also used it continually during both trips of the American Olympic teams to Europe in 1908 and 1912. Care must be exercised not to practise it on too hard a floor. It is particularly valuable for boys and young men who, on account of the nature of their work or their distance from training quarters, desire a substitute for actual track work. I have known a good many athletes who got themselves into splendid physical condition and thoroughly hardened the muscles of their legs and increased their wind by these exercises. From three to five minutes of this kind of work in the morning as a substitute for the

calisthenic work suggested will accomplish wonderful results.

In the chapter on diet I have explained the need of caring for the teeth.

One more essential to bodily health is plenty of sleep. I have seen a great many races lost through failure to observe the rule that every person needs at least eight hours' sleep. Some need more, particularly growing boys. If a person finds that he needs eight or nine hours of sleep to maintain good physical condition he should insist upon getting it. Violation of this law of common sense, through lopping off one or two hours several nights a week which should be devoted to sleep, will bring about its own punishment. Sleep is the great restorer of strength and the tonic for nerves, and the body should be given all it requires.

Before a boy begins his athletic career he must provide himself with the necessary athletic outfit. The candidate for track and field honors should have a uniform composed of a sleeveless or quarter-sleeved jersey and a pair of running trousers. An ordinary suspensory and a pair of running shoes complete

the outfit. The kind of shoes worn will depend upon the event for which the boy is training.

For all the runs, from the short sprints to the two miles, the athlete should wear a shoe with six spikes in the sole, none in the heel. Spiked shoes are not absolutely essential for one who is taking up athletics purely for recreation, but if he wishes to make record time or is competing against other athletes so equipped he should have the spiked shoes. For cross-country running, road work, and Marathon running he should have a shoe with shorter spikes in the sole and a low heel. The heel may or may not have short spikes. The jumper and hurdler uses a shoe the sole of which is slightly stiffened, in addition to which there are two spikes in the heel.

If the athlete trains in cool weather he will find it best to have, in addition to the outfit I have explained, a long-sleeved jersey or sweater with a neck which can be used to protect the face and to keep him from breathing air too cold. He should also wear a pair of long drawers to protect the legs. He can

be as economical as he desires in preparing his outfit, for practically everything with the exception of the suspensory and the shoes may be home-made.

## CHAPTER II

## DIET

Most persons have an entirely wrong conception of what diet means. To most people it conveys the idea that it is some special preparation of foods to be partaken of only by athletes in training or by sick people. I have always claimed, and my experience has borne it out, that the kind of dieting I recommend is the best food not only to keep athletes in good condition, but to keep the average man and woman healthy. It is simply the application of common sense to the food that we eat, the regulation of food for the stomach.

And I wish to say at the beginning of this discussion that a healthy stomach is not only the surest guarantee of health that one can have, but it is indispensable to success in athletics. And in the same proportion that a healthy stomach is necessary to success in

athletics so is it also indispensable to the best work in the intellectual and business world. It will increase the physical and mental efficiency of any man, woman, or child one hundred per cent.

It is a mistake to imagine that the sort of diet I recommend here is expensive or requires preparation by a high-priced chef. The beauty of it is that any competent housekeeper can prepare it. In addition I will guarantee that it will not only put the candidate for athletic honors in good physical condition, but it will benefit in a surprising manner every member of the household.

The best training table diet that I know of consists of the following:

BREAKFAST

One chop or eight ounces of beef.
One or two soft-boiled eggs.
One baked potato.
Toast or bread.
Milk or mild tea.
Prunes or apple sauce (no cream or sugar added).

DINNER

Light soup.
Roast beef, lamb, mutton, or fowl.

Boiled or mashed potato.
Vegetables and fruits in season.
Boiled rice and milk or cornmeal mush.
A light pudding.
Milk or tea.
Toast or bread.

SUPPER

Cold meat (roast beef), lamb, mutton, or fowl, or one small steak. (Only one kind of meat.)
One potato.
Toast or fresh graham bread.
Prunes, apple sauce, or baked apple.
Milk or mild tea.

It will be noticed that in the foregoing I have included several kinds of meat from which one may make a selection. It should be understood that this diet is merely a suggestion and may be varied to suit one's taste. Fruit is always good, but should be taken only in its proper season.

I always caution athletes to abstain from fish and rich meats such as duck. Milk is usually good for most athletes, though it should be remembered that, particularly for distance runners, it is likely to cut the wind and should be taken sparingly or not at all in the height of the training season. There

is nothing better to keep the bowels in good shape than prunes, and they may be eaten at any meal.

It will be observed that I have eliminated from this bill of fare all fish and oysters. These are foods which do not agree with all men, but appetites differ, and an athlete may use certain kinds of fish sparingly if he has a liking for it and it agrees with him. Every one knows that no two persons are constituted alike, and foods that agree with one may not agree with another. This bill of fare is the result of twenty-five years of experimentation on my part with thousands of athletes. With but few exceptions it is the same I used when I was a professional runner. It was evolved after a most careful test to learn what foods kept the stomach in the best condition and made one most efficient athletically and physically.

The trouble with a majority of athletes, and other persons as well, is that they eat too much. It is always best to get up from the table feeling a little hungry rather than to leave with an overloaded stomach. The worst foe of the athlete is indigestion, which,

in nine cases out of ten, is due to a greedy appetite, eating too fast, or partaking of foods and drinks not suitable to the stomach.

In my athletic days a man never thought of drinking ice-water with his meals or concluding them with ice-cream. My experience is that ice-water taken freely with the meals is responsible for more indigestion than any other combination of causes. Water may be cooled a little, but it ought not to be taken ice-cold, especially with meals. I have always advised the drinking of as little water as possible during meals, for the reason that it impedes digestion.

Another cause of bad stomachs among athletes is the tendency to mix various fruits such as oranges and grapefruit with cereal covered with sugar and flooded with cream at breakfast. This combination is enough to sour the strongest stomach and ought to be avoided.

I wish to emphasize the fact that these rules of dieting are not hard-and-fast regulations. Every person should study his own physical condition and govern what he eats and drinks accordingly. I recall two men

who in college rowed on the crew in the spring and played football in the fall. They had voracious appetites and would eat nothing but steaks and drink nothing but water at every meal. If there was no steak they would not eat. At the same table was another man who never touched meat, but he could do just as much work as the two men who devoured steak. And while I am not a vegetarian, I am inclined to think that of the two diets the vegetarian was by far the better, especially in its after effects.

The principal end to be sought by the young athlete is to keep the stomach and bowels in good condition. These two things are as important as the actual training itself. The average person does not pay nearly as much attention to his food, his stomach, and bowels as he ought, and if what I have said induces him to pay more attention to these things, and form correct habits concerning them, it will be of lasting benefit to him.

Any boy or young man who takes up athletics of any kind without acquiring habits of personal cleanliness misses one of the principal lessons which athletics ought to teach.

The more attention paid to such matters, the better athlete one will be, and the better man he will develop into.

In the article on diet I made particular mention of the care of the stomach. The stomach is affected by the condition of other parts of the body, and particularly by the teeth. Every boy and young man should have his teeth examined by a competent dentist, and if there is anything the matter with them they should be attended to promptly. Next, the athlete should make it a point to care for them properly and with regularity. It will be found that good teeth will contribute much toward a good stomach, and a good stomach is one of the essentials to success in athletics. Too much importance cannot be laid upon proper bathing. The body should always be kept clean and the skin in a healthy condition. After taking athletic exercise, the athlete should have a shower-bath if possible. If this is not possible, the body should be thoroughly cleansed with a sponge. Not many boys or young men, unless they are connected with the larger schools and colleges or some of the best clubs, will have the facili-

ties for a rub-down. A good rub-down by an experienced rubber not only keeps the skin in good condition, but it removes lameness and often cures muscle bruises.

## CHAPTER III

## PREPARING FOR ATHLETIC CONTESTS

After the athlete has gotten into condition and has trained faithfully for his event he is ready for competition. But to know how to run a race properly or to do the best work in a field event requires a knowledge that cannot be obtained entirely from faithful training. I have seen hundreds of races lost through inexperience, nervousness, and ignorance of racing knowledge in general; also field events in which the better man did not always win, for the same reasons. Consequently I shall give a few words of instruction about the final preparation for a race or other athletic contest.

First of all, the athlete should aim to have himself in perfect control. He should not worry about his coming competition. The

moment he violates this rule he reduces his chances of victory. Of course, some athletes are of such a nervous temperament that they find it hard to obey this rule. The best way to insure going into a competition in the proper frame of mind is to keep busy until the day of the contest.

I always recommend that the athlete do absolutely no work for at least two days preceding his contest. And if he has had a long enough period of training, say from two months to ten weeks, it will probably be found that it will not be necessary to do very much work the last week. This is the rule I have always adhered to, and in training my teams for the Intercollegiate Championships none of the athletes, except under unusual conditions, did any hard work for five days before the meet, and then only a little jog or very light work. It has been my experience that more athletes suffer in actual competition from too much work than from too little. This applies particularly to those who have been troubled with sore shins or muscles.

Considerable attention should be paid to the diet during the twenty-four hours before the

race. The athlete should not eat anything hard to digest. On the night before the race he need have no fear about eating his usual hearty meal, provided everything on the table is easily digestible. Assuming that the race is to be run in the afternoon, the athlete should eat a moderately good breakfast, toast, a medium-cooked egg, cereal, potatoes. Assuming, furthermore, that the race in the afternoon is to be run at 3 o'clock, the athlete should take his midday lunch not later than 11.30. This should be a light meal, the best diet being toast, one or two soft-boiled eggs, possibly a little light tea, but no dessert of any kind.

The main object of all this care about diet is to have the stomach and bowels in good condition. Constipation is the cause of nearly all the illness and general "out-of-sorts" feelings not only among athletes, but among other persons as well. Particular care should be taken to have these organs in good condition before a race or any other athletic contest.

When the athlete arrives at the field he should still try not to worry about the coming contest, and particularly not to worry

about his competitors. It is the practice of a good many athletes, especially if they have had several years of competition, to attempt to rattle their younger opponents by boastful talking. Beginners should not listen to any such conversation, and particularly should remember that a race is won by the legs and brain and not with the mouth. Finally, I would caution the beginner not to worry about the remarks of his competitors when they go to the mark.

One of the things essential to a successful race is what is called "warming up." This is something which it will pay sprinters, middle and long distance runners, and hurdlers as well, to observe. From a half-hour to an hour before the race the athlete should go on the track, or if that is not available to some place within the field, and warm up easily. The sprinters should take a few starts and then run through two or three short dashes at about three-quarters speed. The hurdlers should do the same, and also try one or two hurdles to make sure of getting the stride properly. In the case of the hurdlers it will probably be found impossible to try a hurdle until the race is ready

to start, because the hurdles are not usually put in place until then. But all starters and other officials will not object to a little warming-up practice first. The distance runners, if their event be half a mile or more, should dance about enough to get the muscles of the leg flexible, and then run from 300 to 600 yards, according to their events, at about three-quarters of their speed in order to fill the lungs with oxygen. After this warming-up practice, the athletes should return to their dressing-rooms and be particular to keep off their feet. In case the weather is at all cool, the athletes should either keep on their drawers, or, when they are not actually running, wear long trousers. This precaution is to keep the muscles from stiffening. Under no circumstances should athletes, waiting for an event or after its conclusion, sit on the damp ground. A blanket should always be carried to protect the legs and arms when it is necessary to wait for an event.

I can give only general directions in regard to the running events. Sprinters, hurdlers, and quarter-milers should take the greatest precautions to insure that the starting-holes

are properly made and firm. To be sure of this, they should try them two or three times before the race actually starts.

It is seldom that the starters in a longer race use the crouch. In the shorter distances great care should be taken to get a good start. The athlete should be sure that he is well-balanced on his hands and feet. The usual form of starting a race is for the starter to give three signals. First, "On your mark." Then the athlete gets quickly into position with the feet in the proper starting-holes, at the same time resting the weight of the body on the knee of the rear leg. Next, the starter will say, "Get set." Then the athlete steadies himself for the crouching start explained in the chapter on Sprinting. When it appears to the starter that all the runners are properly poised and ready, he fires the pistol. With the report of the pistol the race is on. Most sprint races are run in lanes, but the athlete should remember that a straight line is the shortest distance between two given points, and that the quickest way to reach the tape is to run straight. Other things being equal, the man who wabbles is sure to be beaten.

In all races of a quarter of a mile or more there are certain rules which must be observed by the competitors. One is that of passing a runner. This should never be done on the inside, because it is contrary to the rules, and because it is dangerous. The man who does so is not only likely to be disqualified but may be spiked as well. The rule of passing is that a man must be two clean strides ahead of a competitor before he can cut in and take the pole. As a rule, referees do not insist upon the strict observance of this rule. If a man can pass another without shortening his opponent's stride or making him slow up the referee will not usually interfere.

A further precaution which all runners should take is against jostling. Don't jostle, because the athlete usually does himself more harm than his competitor.

In a long-distance race the thing to be most carefully avoided is that of being boxed. A runner is boxed when he is hemmed in by other runners on three sides so that he cannot get out without fouling some of his opponents or dropping back and then passing

on the outside. Boxing a runner is illegal and is never resorted to by fair competitors. If the referee decides that a man has been deliberately boxed by the representatives of a club or institution, he may bar all the runners of the offending team. All races should be run absolutely upon merit and every man for himself.

The reader will understand that more attention must be paid to instruction to runners than to competitors in field events. Broad jumpers, high jumpers, and pole vaulters can take a few short runs in warming up for their events, though they need not do it before they come out for the actual competition. In the case of broad jumpers, they should first make sure of the take-off and then try a few jumps, none of them hard. The high jumpers should likewise make sure of the take-off and then try a few jumps at a moderate height. The same instructions apply to the pole vaulters.

The hammer throwers and weight putters should do just enough work to make sure that they have not lost their form and to get their muscles in good condition. All candi-

dates for field honors should exercise the same precaution as the runners in keeping the body warm on chilly days. It is best to do all the warming-up practice clad in sweaters.

## CHAPTER IV

## SPRINTING

One often hears it said nowadays that "sprinters, like poets, are born, not made." In a measure this is a true statement, because it is just as natural for some men to outstrip their fellows in a foot-race as it is for others to pass their mates in any mental or physical task. It would be a hopeless undertaking to develop a cart-horse into a trotter, because they are built for totally different purposes. So it is almost as hard to make sprinters out of some athletes. It requires a peculiar combination of strength, agility, and nervous energy to make one a successful sprinter, and if nature has not blessed the athlete with these attributes no amount of hard work or coaching can make him a world champion.

At the same time, any man, no matter how

slow he may be, can improve his speed eventually by constant practice and without harm to himself. Every one ought to know how to run well, because in learning to run one acquires the faculty of thinking quickly and handling himself easily.

Before taking up the technical requirements of the sprinter I want to correct a popular fallacy: that, to be a successful sprinter, some particular build is necessary. This is a big mistake, for in the thirty years that I have been training athletes I have seen and trained champions of almost every conceivable build. Some were short of stature and inclined to be too heavy; some were very tall and thin, while others have had what is considered an ideal physique. Consequently a man's shortness of stature is not proof that he cannot sprint, nor should he be dismayed if his physical dimensions run to the other extreme. If there is any advantage to either type of man, I should say that it lies with the one who is tall and strong.

But what he should consider above all these things is whether he has the nervous energy and agility that will enable him to leave his

mark and get away without the loss of a fraction of a second, and the strength to carry him through to the tape without a falter. In sprinting, as in other athletic events, success depends upon the ability to get the maximum return from every ounce of energy without the loss of any of it. To do this is an art that requires intelligent, determined, and conscientious training. There are three points of which the sprinter must make a scientific study if he expects to be a champion. These are: (1) The start. (2) Getting into the stride. (3) The finish.

### (1) The Start

Every successful sprinter nowadays uses the "crouching" start. The standing start used for long-distance races is impractical for the sprinter who needs to get away from his mark at top speed.

The crouching start was first introduced by me. This was in 1887, at Yale, and Charles H. Sherrill was the athlete who first demonstrated its superiority. When he used it in his first race he was laughed at, and the starter, thinking that Sherrill did not under-

THE CROUCHING START.

Robert Kerr, Hamilton, Canada, winner of 200 metres at Olympic games, 1908, selected by Mr. Murphy as absolutely correct pose for the start.

stand how to start, held up the race to give him instructions. Finally, he was made to understand that Sherrill was using a new start. Sherrill immediately demonstrated how superior it was to the old standing start, which it displaced, and now the crouching start is used the world over for sprinters, hurdlers, and even quarter and half milers.

The importance of a good start cannot be overestimated, for a poor or slow start always means defeat if the runners are otherwise evenly matched. The athlete who has mastered the start can usually gain from a yard to two yards at the very beginning of the race on the man who has not yet mastered it.

The object of a good start is to get off the mark and into the natural stride without the waste of strength or time. The first thing the runner should do is to dig the holes for starting. As no portion of the body can touch the ground in front of the starting-line, the holes should be dug so that the runner can get as close to the starting-line as possible and yet be in a position to get away naturally and quickly.

To determine where to dig the holes, the

runner should first assume the correct crouching position. First, get down on one knee. The knee of the back leg should be about even with the inner ankle of the forward foot. This is the proper position for the runner, with the back knee only on the ground, when the starter gives the first of his three signals: "Get on your marks." With the next signal, which is, "Get set," the runner rises on his hands and feet, leaning forward as far as possible without in the slightest losing his balance. In this position he should wait for the report of the pistol, at which he springs forward. Every effort should be to keep the mind concentrated on the gun. If the runner is thinking of anything else he is sure to lose an instant before he realizes that the race is on.

As soon as the sprinter has found an easy, natural position for the crouch he should dig small holes, which can be easily done with the spiked shoes, one hole for each foot. Care should be taken to see that these holes are deep and strong enough to give a firm grip. In preparing the holes they should be so placed that the hands, which are on the start-

ing-line, are not more than six inches in front of the forward foot. As the hands cannot be ahead of the starting-mark, the runner will give away distance by having his feet further back than I have indicated. Some runners with very long legs and arms do give away more distance than this, but the positions I have indicated are best for the normal man. Above all, the sprinter should see that he is well balanced and can get off the mark without a tendency to wabble.

The most important part of the start is that of holding the body and mind in perfect control after being told by the starter to "Get set" and while waiting for the pistol. Let the weight of the body rest on the front leg, a little forward so that the first drive of the leg will send the body forward and upward. It will be found that the fingers will be of great aid in keeping the body properly balanced and directing the first forward spring when the pistol is fired. At the same time, care should be taken to see that there is enough weight on the back foot to keep it firmly in the hole which has been dug for it. The spring should be off both feet. It will

take some time for the sprinter to acquire that perfect control of the body that will enable him to wait for the pistol. He should not get into the habit of swinging back and forth. This habit will either make him go off the mark ahead of the pistol, and then subject him to a penalty, or he will find himself left at the mark. He should also avoid the trick of some runners who aim to gradually move the body forward after getting set, on the assumption that they can time themselves to reach the point farthest forward just as the pistol sounds. This practice loses more races than it wins. They are sure to be set back for "beating the gun."

### (2) Getting into the Stride

The same careful attention to details must be observed after the start. Getting into the stride without loss of energy and without wabbling are just as important as the correct start. As the runner rises from the mark he should spring forward with the impetus which the crouch gives. Then he should make it a point to run straight and true, always remembering that the straightest course

is also the shortest. Many runners make the mistake of taking too long or too short a stride at the first spring. Make it a point to take these first few strides naturally and easily. The runner will be rising gradually and will have covered 20 or 25 yards before he is running erect. He should be careful not to try to reach an erect position too quickly or he will lose speed in consequence. In order to take his strides properly and preserve the equilibrium of the body as he is rising he should take the first few strides as smoothly and as quickly as possible. Careful observation of these points will enable him to be running easily when he gets erect, and he will then be able to put every ounce of strength into his work.

For the first few weeks of his training the sprinter will find that he has plenty to do to master the start and get into his stride. The third course of training, the final burst over the last quarter of the course, must be delayed until he has attained sufficient strength and mastered the two elements mentioned before. No sprinter, whether his distance be 100 yards or 220 yards, should attempt to run

through the full distance at anything like his best speed during the first three weeks of his training. This time should be devoted to practising starts, learning to get into the stride quickly and naturally, with one or two jogs a day through the full distance, but not at his best speed or a speed that will tire him too much.

It will require a great deal of careful practice to master the start. The runner should try it about half a dozen or more times a day, working at good speed for about 20 yards and then slowing down gradually. After a rest he may conclude the day's work with a jog of 120 or 150 yards, though at about four-fifths speed. A few weeks of this kind of training will enable the runner gradually to master the start, after which he will have no trouble in maintaining his speed and equilibrium as he runs in an erect position, which he should be doing by the time he has gone 20 or 25 yards.

The sprinter should make good use of his arms, because they can be made to help the legs in their drive by swinging them forward and upward or by a good, hard cross-motion.

GETTING INTO THE STRIDE.

**James Rector**, University of Virginia, illustrating proper method of sprinter running into erect position.

The sprinter should take particular care never to let the hand drag behind the hip. Every movement should be forward.

### (3) The Final Burst

The candidate is now ready for some real speed work, which brings me to the third portion of the training. First of all, I would caution young sprinters not to overstride, even after having gotten well into their running. To do so will certainly cause the body to be overbalanced at a sacrifice of speed. After the sprinter has learned the art of being natural in his stride its length will adjust itself. His aim should be to run naturally and to use every ounce of his strength. Above all, he should keep his mind strictly on his own work and not allow himself to be pulled out of his stride by an opponent.

It is assumed that by this time the sprinter has been training for at least three weeks and is now ready for some speed work. During the third week the sprinter, who is training for the 100-yard dash, should try himself out with a trial of 100 yards against the watch. This will give him an idea of what he is doing

and at the same time show him whether or not he has enough strength to go the full distance. Probably he will experience a tightening of the muscles, or what athletes term "tie-up," in the last 25 or more yards of the run. Under such conditions the runner wabbles over his last quarter, and has difficulty in finishing. To correct this and enable him to go through the entire distance without slackening his speed, and above all to have a final burst of speed as he approaches the tape, is the climax of his training. Nothing but conscientious work will enable him to overcome this weakening. But practice will bring about the desired result, and soon the legs will be strong enough to carry the runner through the full distance without a let-up in his speed.

After the sprinter has been training for three weeks, and has started to run trials at the end of three or four weeks, care should be exercised to keep these trials down to not more than two a week. If it is possible to run them in a set of games, so much the better. I usually advise sprinters to limit their trials to four-fifths the distance of the race they expect to run. The man who is training

for the 100-yard dash should confine most of his trials to 80 yards, going the full distance about once a week. By working out at his best speed for 80 yards he will depend upon the excitement of the contest to carry him the remaining distance without a let-up in his speed, a theory that seldom fails. Because it takes more strength to run 100 yards properly than most people imagine, I should advise all sprinters not to overestimate their strength, but to train faithfully. In no other way can any one expect to be a 10-second sprinter.

Most athletes who run the 100-yard dash also try the 220-yard event. But they are not always successful, for the furlong race requires more strength and a sustained sprint. The reason that many 100-yard sprinters fail at the longer distance is that they lack the ability so to adjust their speed that they can swing through at an easy gait without tying up.

The method of training for the two sprints is much the same. Like the 100-yard man, the 220-yard runner must be a good starter and, of course, he must have lots of speed.

To run the 220 yards in 22 seconds means a 10-second gait for the entire distance. The principal difference is that the 220-yard man must develop a long, easy stride. Also he must have an accurate knowledge of the pace he can maintain. I have seen a great many races at this distance lost because a man ran himself off his feet during the first half of the race, and then tied up completely in the last half. I cannot lay too much emphasis upon the necessity of learning to swing through this race at almost one's best speed for the first 180 yards. The runner can learn to maintain a stride that will carry him over the ground just as fast as though he tried all the time. The last 50 yards will require the runner to try his hardest. After the athlete has run a few hard races at this distance he will understand better what I mean by advising him to swing through his races without actually trying every step of the way as in the 100-yard dash. This will come to him instinctively.

As a rule, the best 220-yard men are those who can run a greater distance than this, the best of them being able to go at the same

rate for 300 yards. This has been true of such men as Wefers, Craig, Lippincott, Tewksbury, and others.

Since this race requires considerable endurance the candidate for it should practise swinging through from 300 to 350 yards. If he is also training for the 100 yards he will get enough sprinting practice in working for that event, but he should vary his training, taking two or three runs through for 300 yards at about four-fifths speed.

There are not very many 220-yard straightaway courses in this country, so that every man who runs this distance, particularly in indoor meets, must accustom himself to running it around a curve. The only way to learn running around the curve is to practise on a curved track. The novice at sprinting on a curved track instinctively slows up, while the experienced man is able to take the turn without any let-up in his speed. The idea is to take the curve without chopping the stride. In doing this the runner should learn the knack of turning the outward foot in slightly and going at full speed around the curve. Likewise he should be careful never to run

on the heel, for to do so will surely make him fall. I would not advise many trials for this race, because it takes one's strength. It is far better to run the trials in an actual race.

## CHAPTER V

## MIDDLE-DISTANCE RUNNING

THERE are two events which properly belong to this classification, the quarter and half mile runs. They combine both the sprints and the longer distances, in that they necessitate certain of their requirements for success in each. To be a good quarter-mile or half-mile runner the candidate must possess some of the sprinter's speed and the distance man's endurance. Of the two a good sprint is perhaps the more valuable to the quarter-miler, whose event is more like one sustained sprint every yard of the way.

Because of the great popularity of relay racing, nearly every athlete with any running ability at all takes a "fling" at the quarter-mile at some time in his career. The fact that four men get a chance on the relay team makes it possible to try out many more can-

didates for this event than would otherwise be possible. And it is because so many boys and young men try this event that great care should be exercised. I say this because I consider it the hardest event on the athletic programme, not excepting the half-mile and mile runs, which are often pointed to as events which require more nerve and strength than the quarter. To run this distance in record or even fast time requires more speed and endurance than most runners suppose. Therefore I would particularly advise all young athletes never to run this distance unless they are in good condition as the result of conscientious training. Disregard of this injunction is likely to result in permanent injury.

There are two types of men who make good quarter-milers. One is the sprinter who has enough endurance to carry him through the full 440 yards, the other is a half-miler with a good turn of speed who can go through the distance at a uniformly fast clip. M. W. Long, the former Columbia University man and holder of the world record of 47 seconds for the straightaway track, was a man of the first type. Long could sprint

both the 100 and 220 yards in even time, and yet had enough strength for the double furlong. Another such runner was C. D. Reidpath, of Syracuse University, holder of the intercollegiate record of 48 seconds, and of the Olympic record for 400 metres. Representing the second might be mentioned J. E. Meredith, of the University of Pennsylvania, and winner of the 800 metres run at the Olympic games. Meredith's best distance was somewhere between the quarter and half mile runs, but he was able to run the 440 yards in close to 48 seconds. The quarter-miler whose chief dependence is his sprinting ability will do his best work in the first part of the race, while the other type of man will maintain a more even gait for the entire distance. Of the two types, the sprinter, provided he has the endurance, is the more likely to be the record-breaker.

Probably it is because many schoolboys turn their attention to quarter-mile running that it is so frequently overdone. It has been my experience with college athletes that many of them injure or unfit themselves for first-class work as college men by too much quarter-

mile running while in preparatory school. The blame for this condition of affairs should be put squarely up to young and inexperienced physical directors. Too often preparatory schools employ men as athletic trainers who have little or no practical experience in running the distances for which they are training young boys. Not only do they attempt to make quarter-milers out of boys who are unfitted for the distance, but, in their anxiety to make a wonderful showing in the various meets in which their teams are entered, they make them run too many events in one day. Fortunately, we are not having so many breakdowns among athletes as we once did, and credit for this is due to a more sensible system of training.

Every quarter-miler should master the principle of the crouching start and learn how to get into his stride quickly and naturally, following the instructions I have given on sprinting. The ability to start quickly in the quarter-mile is fully as important as in the sprints. As most quarter-mile races are run on a circular track, the quickest starter stands the best chance to get the pole at the first

corner, a consideration which is not to be overlooked.

During the preliminary training for this event the runner should do considerable jogging at distances greater than a quarter-mile. Usually a jog of half a mile or 600 yards will be found sufficient, but if the runner also has the half-mile in mind he will find it best to jog along three-quarters of a mile or more. The object of this sort of training is merely to acquire the necessary sort of endurance, and the amount of jogging one should do will depend upon what he can do without the stiffening of the muscles.

After getting the legs and wind in fairly good shape the runner should begin a little speed work, training with the sprinters preferably. This work should consist of practising starts, taking a few short sprints, with a moderately fast run of 200 yards. As the athlete gets stronger he can increase the length of his sprints to 300 yards, which he should do without tiring. Assuming that his training is to cover a period of from six to eight weeks he should be at this stage by half the time. For the remaining portion of his train-

ing he can reduce somewhat the length and frequency of the jogs if he feels he has gained enough endurance. From this time on he should work for speed, which will be the deciding factor in his races. His training calls for careful attention to quick starting and a well-sustained sprint for most of the distance, though care should be taken not to run himself off his feet in the first 300 yards. He should be particular to get a long, swinging stride which will carry him over the ground without tiring him too much for the final sprint. Unless running a trial, the athlete should not go more than four-fifths of the distance at top speed. As a rule, it is not wise to run more than one trial a week, and if possible this should be done in a race. As I remarked in the case of sprinting, it will be found that if the runner accustoms himself to covering four-fifths of the distance at his best speed he will be able to maintain this gait; and the excitement of the contest will enable him to finish the last fifth of the journey without distress.

It is a race which requires splendid judgment. The greatest mistake the quarter-miler

is likely to make is that of running himself off his feet during the first 300 yards, particularly if it be in a relay race. Every man should know his own pace and run his own race.

## CHAPTER VI

## THE HALF-MILE RUN

EVERY athlete who runs the half-mile, which is the shortest of the distance runs, will get his first taste of distance running in training for it. Because there are certain principles which every distance runner must observe I will discuss them here, and they may be borne in mind as the longer distances are treated of later. It is hardly necessary to remind the sprinter or even the quarter-miler that he must run on his toes. He acquires that habit naturally in an effort to make speed, but men who are running longer distances may frequently be seen running flat-footed and breathing through the nose, two mistakes which must be eradicated before one can hope for success in these events. By running on the toes I do not mean to keep on the toes in the extreme manner that sprinters do.

The athlete should aim rather to run on the ball of the foot. When he becomes tired he will naturally fall into the habit of running flat-footed. Unless he runs this way all the time, the runner does himself no harm by occasionally running flat-footed, especially when he is jogging long distances to strengthen his endurance. The object of running on the ball of the foot is to get more spring into the stride and to lessen the shock to the nerves and muscles of the feet and legs. In this connection let me warn runners against "pounding" or striking the track unnecessarily hard. To do this will bring on an affliction of sore shins extremely difficult to cure and which may bring one's running career to an end. The object of distance running is to develop a free, easy stride and not to try to run on the toes too quickly.

The distance runner must be careful about the way he holds his arms. The beginner seldom realizes that he runs quite as much with his arms as with his legs. I seldom instruct a runner to carry his arms in any particular manner if he carries them easily and naturally so that they do not tend to retard

his momentum. At the same time the runner should make sure that he is holding his head well up, just as in walking, for this will enable him to breathe freely.

It is especially important that distance runners should breathe properly. Practically every distance runner breathes through both the nose and mouth. The "wind" is one of the most essential things to success in distance running, consequently the athlete should be extremely careful not to waste his strength by incorrect breathing. Most distance runners get what is called "the second wind" for most distances from a mile up. In the case of a mile run this reaction comes usually during the third quarter and is a distinct relief to the runner. One need not feel worried if he fails to get his second wind, for I have known mile runners to fail to get it and still others who did not realize it when it did come.

All distance runners should take scrupulous care of their feet and under no circumstances permit the toes to become raw and sore. All kinds of trouble arise from sore feet. The distance runner should wear comfortable shoes with chamois pads to protect

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UNDER FULL SPEED AND PERFECT CONTROL.

J. E. Meredith, world's half-mile champion, making American interscholastic record for quarter-mile run, 48 4-5 seconds.

the toes, or a clean stocking will answer the same purpose. If the feet and toes become chafed they should be protected by a piece of surgeon's plaster. If this cannot be obtained a little absorbent cotton or even a piece of clean cloth wound around the chafed spot will help. If it is found that the skin is tender and easily broken it is well to frequently soak the feet in a solution of warm water and salt to harden the skin. Unclean stockings or pushers are responsible for many cases of sore feet. These should be kept absolutely clean even if the athlete has to wash them himself.

The first problem which confronts the half-mile runner is that of getting his legs in such condition that he can train without getting pains which come from sore muscles. To accomplish this it is necessary to do a great deal of moderate jogging before any effort is made to acquire speed, consequently the runner should take things easy at the start. If he becomes too ambitious he will find that he is making haste slowly. For the first few days he should swing along at a free gait and stop as soon as he feels tired. For the beginner it is not a bad idea to use tennis shoes.

After he has begun to feel a bit tired it is well to walk a short distance until rested and then to try two or three more easy runs. The calves of the legs are sure to become sore at the beginning and it will hurt one to walk. But if the advice to work easily is observed at the start the soreness will gradually disappear and the muscles will become sufficiently hardened to do more severe work.

As soon as the legs are in pretty fair shape the runner can begin to work out for 440 and 660 yards at about the speed he thinks he can hold for a half-mile: the quarter in 60 seconds and the 660 in about 1.35. This exercise will serve very well until the runner is in moderately good shape. After that he can vary it by going a little farther but always trying to maintain about the same rate of speed. The first-class man, by which I mean one able to run the half-mile in 2 minutes or better, will run through the 660 yards in 1.26, which he should do once or twice a week. A man who can run the half in 2.10 should be satisfied with 1.34 for the 660. The beginner, of course, will run the distance considerably more slowly.

If the sort of training I have outlined here is followed for a period of four weeks the runner will be in condition for hard work. During the last half of his training his work should be much the same as I have outlined. He will now be in condition for an occasional trial over the full distance to see how fast he is moving. Ordinarily, I do not advise these trials more than once a week. If it is possible to take the trial in an actual meet, so much the better, because it will give one the training he needs and racing experience that can be obtained in no other way. By comparing the times of the various trials the runner will know whether or not he is getting enough work. If he feels the need of longer jogs he should not hesitate to take them. He needs strength to run this distance, and there are bound to be periods in his training when he can make greater progress by devoting more time to jogs of from three-quarters of a mile to a mile than by speed work. But, generally speaking, a good week's training will consist of two jogs at about four-fifths speed for 1,000 yards or three-quarters of a mile, with two fast 660-yard runs at the best speed on al-

ternate days and a trial or race on the fifth day. If the athlete desires to compete in a race at the end of the week he will wish to hold the day before the contest open for very light work, or none at all, according to his condition.

Before the half-miler has finished his training he will realize that this event is a hard one because it requires almost the same combination of speed and endurance that the quarter-mile does. Speed is one of the essentials, and if a man can do a fast quarter he will find it of incalculable value for the half-mile. In fact practically all of the champion half-mile and mile runners have been able to run the quarter-mile almost equally well. Meredith, who holds the world's record of 1.52¼ for the half-mile run, was able to run the quarter in nearly 48 seconds, while Kilpatrick and Sheppard, with records of 1.53⅘ and 1.53⅘ respectively, could run the quarter-mile in close to 49 seconds. It is an interesting fact that in the 800-metre run in Stockholm in 1912, Meredith, the winner; Sheppard, who was second; Davenport, who was third; and Braun, of Germany, were all wonderfully fast

quarter-milers, and the first lap of that race was undoubtedly the fastest first quarter of a half-mile that was ever run.

## CHAPTER VII

## THE ONE-MILE AND TWO-MILE RUNS

If there is any event on the athletic programme which challenges the quarter mile in demanding unusual powers of endurance it is the mile run. There was a time when it was thought that to be a competent mile runner required only the ability to "loaf" through the first three-quarters and then to sprint the last. A history of the mile run at the Intercollegiate Championships shows the great change which has been wrought in this event. In 1876, the first year of the championships, the mile was won in 4.58½, time which would shame a schoolboy of the present day. Three years later 5.24⅝ was fast enough to win. In 1880 it was run under 4.40 for the first time, but not until 1889 was it run under 4.30. It hovered around this mark until 1895, when the record was reduced to 4.23⅖. This rec-

ord stood until 1907, when it was reduced to 4.20⅘. It went below 4.20 for the first time in 1909, when W. C. Paull, of the University of Pennsylvania, set it at 4.17⅘. Two years later J. P. Jones, of Cornell, lowered Paull's figures 2⅘ seconds, making a new world's record of 4.15⅘, a record which he lowered by a full second in 1913.

This gradual reduction in time has been the result, partly of keener competition, but more of the scientific study of the event, the knowledge of how to run the various quarters to finish in the quickest time. It is impossible to tell a mile runner just how he should run each quarter, but as a rule the best time is made by making the first quarter the fastest, letting down a little for the second half, working hard on the third lap, and finishing the final lap as best one is able. In 1909, when W. C. Paull made his intercollegiate record of 4.17⅘, he ran his first quarter in 57 seconds, the half in 2.03, and the three-quarters in 3.10⅘. The third quarter was run only 1⅘ seconds slower than the second.

[That the foregoing remarks are not always

true is proven by the wonderful run of J. P. Jones, of Cornell, in 1913. In fact, the time for the various quarters of this race stamped Jones as almost superhuman. He ran the first quarter in 61⅘ seconds. He finished the half in 2.09⅘ and the three-quarters in 3.16⅕. Then he ran the last quarter in 58⅘ seconds. This was sufficient to enable Jones to win, but if he could have been paced to run the first half in about 2.03 he would have done 4.10 or better for the distance.—EDITOR.]

The best kind of training for the mile run is cross-country running taken in the fall and winter. Endurance is of great importance in this race, and there is nothing like this kind of work to make any youngster strong. Furthermore, it is a sort of training that will do almost any boy or young man more good than he imagines. In proof of this contention I would mention an instance when I had three hundred men at one time doing this sort of work into the middle of January and keeping it up until well in March. So beneficial was it that the smallest gain in weight for any of the boys was 8 pounds, while one man gained 19 pounds.

These boys ran on the streets in all kinds of weather, though the younger ones were always under the care of an older runner. The running outfit consisted of an old pair of street shoes, a long pair of woollen stockings, a pair of old trousers cut off below the knees, an undershirt, sweater, and cap. From the start I permitted the men to run only a short distance, which was gradually increased to three miles or more. Upon their return to training quarters the boys removed their running clothes and took a few simple body-building exercises, followed by a shower-bath. In order that the run should not injure any of the men or retard the others, the weaker ones were worked into a class by themselves and placed in charge of an experienced man.

To any one who contemplates taking up middle-distance running, I do not know of any preliminary course that could be recommended superior to the one I have given here. It is work which can be taken up either in the fall or the early spring. However, in pursuing such a course of training I would particularly caution the athletes who do their running in cold weather to keep the neck of

the sweater well up over the mouth to protect the lungs from the cold air which they are breathing. At the same time the runners should avoid pounding the pavements or track, for this will produce sore shins, the bane of every distance runner. There are, of course, many who cannot spare the time for a preliminary training of this length. I should advise them to begin their training by taking an easy run after the manner prescribed for the half-mile, only longer. The beginner should swing along until he begins to feel tired. After a short walk about the field he should be able to take another run, not too hard. This sort of training should be sufficient for the first two weeks, during which time the runner will gradually work out the soreness from his muscles and increase his endurance. At the end of two weeks he will be able to stand a little faster pace. If so he should try a half-mile at about a 2.20 gait. If he finds that this pace does not tire him he may keep on at the same speed until he begins to tire.

At about the third or fourth week of his training he should do some longer work, run-

ning as much as two miles or more twice a week. He will need this to give him the necessary endurance and confidence in his ability to run the full mile. This work should be varied with a few quarter-mile runs at his best speed and perhaps one run a week against time over the full mile.

A good mile runner must be a sure judge of pace. One of the most common tricks of experienced mile runners who can sprint is to set out at a good speed, then slow down the pace gradually and wait for the finish. In this way a poor runner with a sprint at the finish can frequently defeat a man who, if he had followed his own pace throughout, would have been an easy winner. This not only emphasizes the need of judging pace properly but also of acquiring ability to sprint at the finish.

Preparation for the two-mile run is much the same as for the one-mile. The two-miler naturally requires more endurance, but this will be secured by lengthening the distance of the jogs referred to earlier in this chapter. Thus, instead of working out for three-quarters of a mile, the two-mile candidates go a mile

or a mile and a quarter, later increasing this distance to a mile and a half. Cross-country running is ideal preliminary training for this event, and any man who is a good cross-country runner ought to be a good two-miler.

I will assume that the boy or young man who is training for this event has from eight to ten weeks in which to get into condition. For the first week his work should be limited to about three easy jogs of from one to two miles, substituting for one of these runs a cross-country jog. If he feels able and his legs are not too sore he might try a few shorter runs, but the main thing is to develop endurance without acquiring sore shins and muscles.

The beginner at this distance should be able to run it, after he has gotten the necessary strength, in from 11 minutes to 11 minutes 30 seconds. This time will be steadily reduced. To run the distance in 11 minutes the first mile should be run in about 5.30, the aim being to run the second mile fully as fast as the first. To do this successfully the runner must know his pace and not run himself off his feet or allow his competitors to do it for

him. His object should be to run the distance without an undue strain and to have enough reserve strength left for the final sprint. He need have no fear of danger to his heart, because there is less likelihood of it in this event than in the quarter- or half-mile runs.

I cannot lay down an exact schedule of training for this event. The amount of work a two-miler does must depend upon the time he has for training and how he feels. I have always been a great believer in plenty of work for distance runners. If a man is able to run cross-country in the fall he will find it an easy matter to get in shape for the two-mile run in the spring. In general he will find that the directions I have given for the one mile, if applied to the longer distance, and practically doubling the amount of work, will get him in shape.

The two-miler must not forget the importance of speed work. Other things being equal, nine out of ten two-mile races are won by the man who has the sprint. I have always made it a point to train all my distance runners in speed work, independently of training them

to develop endurance. Sprinting brings into play a different set of muscles, and when one is tired at the end of seven laps with the long stride of the two miles, if he is any sprinter at all he will be surprised at the easy manner in which he can sprint for a good part of the last lap. The man who can sprint at the finish can afford to let his rivals set the pace, but he should not make the mistake of delaying his sprint too long. The best two-mile runners I have ever seen were able to sprint from 200 to 300 yards. This is an event which calls for plenty of courage and clear-headed judgment of pace. Before the two-miler goes into a race he should have timed himself so that he will know his own pace and not be run off his feet.

If one has endurance for two-mile running he will find that this is the most beneficial event and if properly indulged in will build him up and increase his weight without injuring him in any particular.

## CHAPTER VIII

## CROSS-COUNTRY RUNNING

THE development of cross-country running in our preparatory schools, colleges, and clubs has been the most important factor in raising the standard of distance runners in this country. Prior to the Olympic games in 1908 the United States was distinctly inferior to England at all events from the half-mile up. Nearly all of our original ideas on training came from England. Upon this as a foundation the United States has made great improvement and has developed many ideas which England is now copying from us.

England's superiority at all the distances was due to the fact that Englishmen were taught to run distances from their youth up. Such games as the paper-chase and hare and hounds were almost a part of the English boy's education. With this as a foundation

it was easy and natural for England to produce good distance runners.

It was not until the United States began to foster cross-country running that we began to develop good distance runners. The Inter-Collegiate Cross-Country Association conducted its first run over the Morris Park course, New York, in 1899, and since that time the popularity of this sport has grown by leaps and bounds. Not only has it spread remarkably in the colleges, but it has taken hold in our high schools, preparatory schools, and academies, not to mention the athletic clubs which have followed suit. The fruits of this policy were shown in striking manner at the 1908 Olympic games, when the United States won the 800 and 1,500 metre runs, as well as the Marathon, and performed creditably in the team and steeplechase events. At Stockholm, in 1912, we did even better, not only winning the 800-metre race and the 3,000-metre team race, but having ten of our representatives to finish in the first eighteen in the Marathon. In this respect we quite outstripped England, our original teacher.

Cross-country running, if properly indulged in, is one of the most healthful recreations I know of, even if one does not follow it in the hope of becoming a champion distance runner. If indulged in moderately it strengthens every part of the body, and I have seen many a boy who was almost made over by the sport. Some persons have the idea that cross-country running necessarily reduces the weight. If indulged in properly it will put on weight besides toning up the entire body. Not only is it good for distance runners, but in a modified form is invaluable for football players, oarsmen, and those who merely want some good conditioning exercise.

The best results from cross-country running are obtained in the fall, winter, and early spring. Cross-country running should never be done in extremely cold weather, and always in cool weather the athlete should be properly dressed. He should always wear a long-sleeved jersey with a neck. Underneath his running trousers he should wear a pair of long drawers and, in addition to comfortable shoes, a pair of socks. If running against the wind in very cold weather it is

best to protect the chest with a piece of newspaper or brown wrapping paper.

Cross-country running in this country is usually done over a course of from 5 to 7 miles, 6 miles being the length of the intercollegiate course. A cross-country course should be over a country road or turf, never on asphalt or similarly hard pavements. I do not encourage running on the pavement, because it injures the legs. A little effort will find a suitable course in the country or a park. Different methods of training are required for the man or boy who takes up cross-country running for health and the one who pursues it to become a champion runner. The one whose object is merely health and the building up of the body will not train as hard or consistently as the one who wishes to become a champion. What I shall say on the subject of training for this event applies more particularly to the boy who trains for the race. The boy who merely wants a good exercise can follow any part of this training that he so desires or finds suitable.

At the start let us assume that the boy is training for a race of 5 or 6 miles. If he

has not been training for some months it will require at least eight weeks in which to get in condition for a race of this length. At the outset it should be remembered that the cross-country stride is different from that of the mile runner in that it is much more loose and usually shorter. A boy of nineteen or twenty years of age ought to be able, in condition, to cover the course at the rate of a mile in 6 minutes. Nearly any person with ordinary endurance can learn to jog a mile in 6 minutes. During the first week the runner should be careful not to overtax his endurance or put an undue strain upon the legs. Sore shins or muscles are not easily cured, and one will make better time by taking care of them at the start. The first week's work should be a combination of easy jogs and walking. A three-mile jog should be the limit for the first week, though it may be supplemented by continuing at a walk over the remainder of the course. I would caution runners not to train more than four or five times a week, and one of these days may be devoted to a cross-country walk of from 4 to 8 miles, according to the way the athlete feels.

This course of training may be gradually increased in hardship, lengthening the distance run and increasing the speed. By the end of the fifth week the athlete should be able to go the entire distance at a pretty good pace, though I would not advise an attempt to make good time more than once a week, nor would I advise running the full distance in a trial more than once a week. Before a cross-country race, the runner should not have trained within two days, and he need not be worried if he has been unable to run a trial over the full course, for if he is in moderately good condition he will find that the excitement of the race will carry him through.

I have often been asked if cross-country running slows up a man for the half-mile and mile runs. I invariably answer no. As a rule, it will be found that cross-country running improves a miler and does not reduce his speed, which seems to be the thing most feared. The history of the Inter-Collegiate A. A. A. A. and cross-country championships will show that the best cross-country runners have nearly always been the best half-mile and mile runners. Conspicuous examples of this truth

were George Orton, Alexander Grant, and W. C. Paull, of Pennsylvania; John Cregan, of Princeton; and J. P. Jones, of Cornell, nearly all of these men being just as fast at the half-mile and mile as they were over the cross-country course.

Schoolboys, especially those under eighteen years of age, should do cross-country work sparingly. Such sports as hare-and-hound racing, in which boys have a chance to slow down, does them good, but I would not advise boys to run cross-country races of more than 3 miles in length. And boys under sixteen, particularly if they have not attained their growth, should confine their cross-country exercise to walks and easy jogs. They will find that moderation at their age will be best for their health, and that when eighteen years old and over they will be able to do something worth while. I have known cases in which boys were rendered unfit for further athletic competition by doing too much strenuous cross-country running at too early an age.

The best way for a college, club, or school to develop interest in cross-country running is for a group to train together. The most

experienced runner of the group should act as the pace-maker, but he should understand the art of pace-making so that he will not let the others run themselves off their feet or engage in racing practice when they should be merely jogging. Training alone makes cross-country work irksome.

## CHAPTER IX

## THE MARATHON RUN

THE revival of the Olympic games is responsible for the great interest taken throughout this country in Marathon running on the part of amateurs. In the early days of our athletic history, professionals indulged in these long runs, frequently competing in distances greater than the Marathon. But the amateurs have taken it up only since it was made such a feature of the Olympic games revived at Athens in 1896. Marathon running became a craze in this country in the fall of 1908, after Johnny Hayes had won the Marathon run at the Olympic games held in London that summer. That race was one of the most remarkable and sensational contests in the world's history, and being won by an American naturally aroused great interest in this sort of long-distance work.

When I saw to what extent the Marathon

craze was being pursued by boys and immature young men, not properly trained, I sounded a warning against it, and I have been trying ever since to persuade boys and young men not fitted for a race which requires so much endurance to leave it alone. In particular, no boy under eighteen years should run this distance. Twenty years is young enough for so great an effort.

Before an athlete decides to take up Marathon running he should be very sure of himself on several points. First of all, he should know that he has the endurance for a long run, the Marathon distance being approximately 25 miles. The fact that a young man can run 5 miles is not good evidence that he can run 25 miles. I have always gone on this theory, that if one can run 5 miles comfortably, he can also run 10 miles without injury. And if one finds that 10 or 12 miles can be covered without great distress the chances are that with the proper training he can go the Marathon distance. In other words, one should never take up Marathon running unless he has demonstrated to himself that he has the strength to do it.

Another point a Marathon runner should bear in mind is this: any race or competition that results in such physical exhaustion as must follow a Marathon contest demands that the athlete have plenty of time to rest. The number of men who are fitted by nature or by their occupations to run the Marathon distance is very few. Clerks who sit down most of the time can stand more work than a man who is constantly on his feet. But unless a man is so situated that he can get all the sleep and rest he needs he should not take up Marathon running.

In order to get in condition for so hard a race a man should be able to run frequently for more than an hour. Often he needs to run two hours or more. Few young men who are students or who work in shops or offices have the time to devote to this sort of training. But even if they had the time they would be unable to devote a corresponding amount of time to the rest which such training makes absolutely necessary. This is the feature of training for Marathons which most ambitious youngsters overlook. It is also a principle of good health. Long periods

of hard work call for a corresponding period of rest. This applies likewise to our daily life, though many people do not seem to realize it. I hold that no man, under any circumstances, should force himself until he is dragged out.

In telling Marathon runners how to train I shall assume from the start that the candidate for honors has either been a cross-country runner or has demonstrated to his own satisfaction that he can run from 5 to 10 miles. Whether he can run the full distance he must demonstrate for himself with a trial, but this trial should not be attempted until the runner is in perfect condition as a result of a system of rigorous training. The best kind of preliminary work is a combination of cross-country running, walking, and jogging. A cross-country walk combined with a slow jog which will take a man a mile in about 7 or 8 minutes is the best way to get the legs and the wind in condition. This can be done two or three times a week, gradually increasing the distance from 5 to 10 or 15 miles according to the athlete's condition. It may also be varied with a run of 5 or 10

START OF A SENSATIONAL MARATHON.

Runners leaving Windsor Castle in the Marathon run, Olympic games, London, 1908.

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miles. The amount of work done will depend upon how the athlete feels and the amount of time he has to give to it.

A man should not expect to get in condition for a Marathon run with less than eight or ten weeks of training. The first month should be devoted to strengthening the legs by the cross-country runs and walks I have explained. The last half of the training should be devoted to faster and longer work, though the cross-country walks and jogs should not be discontinued. If the athlete is obliged to work for a living, but can arrange to do nothing but train for the last three weeks, it will be to his advantage. In 1908 and 1912 the candidates for the American Olympic team had not had enough work before leaving New York. On shipboard they trained an average of about one hour a day, Sunday excepted. For two weeks prior to each race I gave them all the work they could stand. In preparation for the London Marathon, after the men reached Brighton I increased the distance from 12 to 30 miles. The boys had nothing else to do, and as they were gaining in weight I knew they could stand the work. What I

aimed to teach them was to run along easily, with just as little effort as would be called for in a good walk. In this way it did not take anything more out of them to jog along 8 or 9 miles in an hour than to walk half as fast in the same time. Several times during the last two weeks of their training, both at London and at Stockholm, the men went the full Marathon distance and did some pretty stiff training every day. The thing I would emphasize more than anything else is for the Marathon runner to acquire the art of running easily. The amount of work he should do will vary according to his occupation and the way he feels.

The essentials are plenty of work, though not an excess of it, a good diet, plenty of sleep and rest, and no alcohol or tobacco. It is not necessary to be over-particular of what one eats providing it is good, nourishing food. Cakes, pastry, and other food hard to digest should be avoided.

A great many Marathon races are lost because of a runner's desire to keep up with too fast a pace at the start. The success of Johnny Hayes and all the American compet-

itors at London in 1908 was due to the fact that they had been trained to run at a certain speed. They had gone over the distance often enough to know just how fast they could run. In other words, they knew their own pace. At the start of that run several of the English entrants ran themselves off their feet, the result being that the first Englishman to finish was No. 12. Four Americans who used their heads finished in front of him.

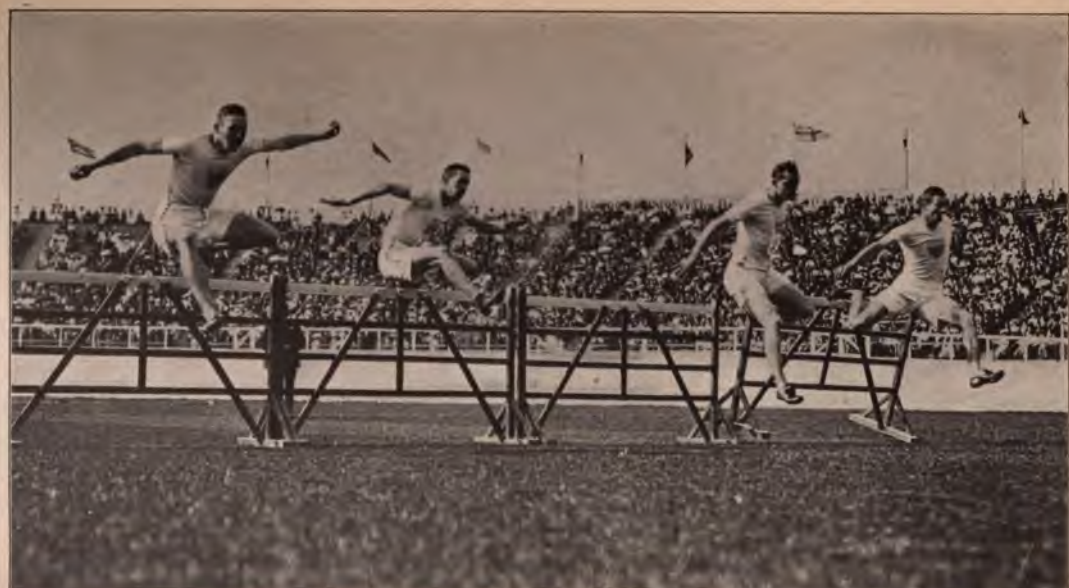
What I have said about the protection of the body in the chapter on cross-country running applies even more to the Marathon distance. The throat and chest should be especially well protected.

# CHAPTER X

## HURDLING

To discover and develop a good hurdler from a squad of track athletes is one of the most difficult tasks that confronts the coach. For the same reason the man who selects this event needs, besides some aptitude for it, a goodly amount of courage and determination. When success finally crowns the hurdler's efforts he has mastered one of the spectacular events on the track programme.

Any discussion on the art of hurdling should be preceded by the explanation that there are two kinds of hurdle-racing, the high and the low, and that each requires a special style. In the high hurdles there are ten hurdles, each 3 feet 6 inches in height, placed 10 yards apart over a course of 120 yards. This allows 15 yards to the first hurdle and 15 yards between the last hurdle and the tape. For the



A HIGH HURDLE RACE.

Final of 110-metre hurdles at Olympic games, 1908, showing the four Americans who won all the points clearing the first hurdle. Left to right, Garrells, Rand, Smithson, Shaw.

low hurdles there are the same number of obstacles, but each is only 2 feet 6 inches in height and the distance of the race is 220 yards. In this race the hurdles are placed 20 yards apart with 20 yards to the first hurdle and 20 yards from the last hurdle to the tape. It is nearly always the case that a hurdler is equally good for the two events just as one sprinter can master both the 100 and the 220 yard dashes. This rule is more likely to be borne out if the men are of good size. It is very rare to find a short man who can hold his stride in the low hurdles.

Unlike the sprinter, the hurdler should have a particular build if he expects to be a real champion. This peculiarity is that he must be above the average in height. It is true that some short men have made creditable records in the hurdles, but a study of the champions will show that almost without exception they are men whose height is five feet ten inches or more. Stephen Chase, of Dartmouth, one of the first hurdlers to run the distance in 15⅘ seconds, was six feet two inches in height. A. C. Kraenzlein, who still holds the world's record for the low hurdles,

is six feet in height. Smithson, who established the world's record of 15 seconds for the 110-metre hurdles at London in 1908, was close to six feet, and so was Fred Kelly, of the University of Southern California, who won the event in Stockholm in 1912.

The height of the hurdles and the distances between them makes it necessary for the hurdler to have fairly long legs.

With good height and well-proportioned limbs there should be combined good sprinting ability. A. C. Kraenzlein could always sprint 100 yards in 10 seconds, while Forrest Smithson was almost as fast. In fact, no man that cannot sprint 100 yards in better than 11 seconds can hope to equal 15⅘ seconds for the high hurdles. In view of the importance of speed, the candidate for hurdling honors should devote some time to practising starting and sprinting. The more proficient he is in these the better will be his chances for success.

In view of the different styles demanded for the high and low hurdles, I shall discuss them separately.

## The High Hurdles

Primarily, the athlete should learn the proper method to clear or jump the hurdles. To accomplish this he should practise with one hurdle until it is fairly well mastered. As the first hurdle in the 120-yard event is 15 yards from the start, it should be placed at this distance for practice in order to accustom oneself to getting the correct stride. The hurdles should be taken at moderate speed. As the athlete rises to go over it the front foot should be pointed well up. As soon as this foot is over the back leg should be brought along, though not too hard. This leg should have a lateral motion, that is, gradually turning outward, so that when the athlete is on top of the hurdle the leg will be almost at right angles to the body. To do this properly the back leg should be brought forward and outward the moment it leaves the ground so that it will bring the knee clear of the hurdle without compelling one to jump too high.

If the hurdler is just learning the knack of clearing the hurdle he will find that his great-

est fault is that of jumping too high. That the shortest distance between two points is also the quickest is just as true in hurdling as in running. For this reason the aim of the finished hurdler is to skim the hurdle with as narrow a margin as possible. At the same time he should bear in mind that it is equally dangerous to him for fast time to strike the hurdles. And if the hurdles are of the immovable sort he will be sure to get some nasty falls, thus making his defeat in a race certain. By diligent practice he will be able to overcome this tendency to jump too high, and when he has become expert he will be able to clear a flight of ten hurdles with less than an inch to spare over each and perhaps without touching a single one.

Just as soon as he has learned how to jump the hurdles in a rough sort of way he should practise with three hurdles. He should be very careful not to get into the habit of "bucking" the hurdle, which is caused by running too fast at the first hurdle and making him halt just as he is ready to jump. It will interfere with his speed to a certain extent and he will have trouble in getting up

to the second hurdle. It is one of the most common faults which youngsters have to overcome.

Inasmuch as the distance to the first hurdle is 15 yards, the hurdler should be careful to get his stride right so that his jumping foot will come the proper distance from the first hurdle which should be about 2 yards. In order to do this properly he should try a few experiments. First he should start from the left foot, and if this does not bring him to the hurdle right he should change and start from the other foot. One or the other will land him there in the proper manner. After this has been mastered he should aim to get over the first hurdle and get the foot down as quickly as possible. This jump is usually about 12 feet, but, as the hurdler's purpose is to get the foot down without loss of time, constant practice will shorten the length of this jump.

After learning to clear the hurdles properly the athlete should turn his attention to getting the stride right between hurdles. The normal man should clear the distance between two hurdles in three strides. He is certain

to have trouble in doing this at the start, and only constant practice will enable him to take the correct number of strides and reach each hurdle at the proper point and with enough momentum to carry him over.

Having explained the principles of high hurdling, let me give some instructions about getting into proper condition. Primarily, I would warn the beginner not to overdo his jumping. A sure result of this is sore shins, which are caused by a jar to the lower end of the shin-bone when landing and which nothing but rest will cure. Consequently he should be careful not to overdo this part of his training. The beginner should try not more than three hurdles about five or six times a day, and if possible he should practise on the grass where he will not jar his legs so much by the jumps or be cut up in case of a fall. As soon as the hurdler finds that he is progressing favorably he might add two more hurdles at the end of a couple of weeks and practise them moderately until he can clear them without losing his stride. This he should be able to do within three or four weeks. After having mastered hurdling to this extent the ath-

lete is ready for a try-out in a race, and if he can keep his stride for eight hurdles in practice he can do the full ten in a race, provided always he attends strictly to his own race.

Every hurdler is bound to suffer frequently from sore legs during the early part of his practice. When the legs get so that it pains severely to jump they should be given a rest, and in case of sore shins or weak ankles an elastic bandage should be worn for a time. It will probably be found better to vary the training with some practice at sprinting and starting, and with an occasional jog of 150 yards or more. Most hurdlers will find it to their advantage to practise the hurdles no more than four times a week, devoting the remaining time to sprinting or resting.

## The Low Hurdles

The main difference between training for the high and the low hurdles is in the manner of clearing the hurdles. Added to this is the requirement for more endurance. The principal essential to success in the low hurdles is learning to take the hurdle "in your stride." As the low hurdles are only 2 feet 6 inches

in height this is possible with them but impossible with the high sticks. The manner of approaching the hurdle is much the same, the front foot being pointed up, but the lateral stride of the back foot is missing. The stride for the low hurdles is what might be termed an "elongated" stride. Very few hurdlers are able to fully attain this. Naturally, it can be best acquired by a tall man with long legs. A. C. Kraenzlein, the holder of the world's record for this distance, had it mastered better than any man I ever saw. Kraenzlein could probably sprint 220 yards on the flat in 22 seconds. His world's record is 23⅘ seconds for ten hurdles over this distance, consequently the clearing of these obstacles could have added only 1⅘ seconds to his time. This sort of speed requires perfection in the art of clearing the hurdles. In fact, Kraenzlein cleared them so easily that, except for a momentary rise and halting as he went over the hurdle, one might have thought that he were running a 220-yard sprint race.

For the same reason that the athlete should take only three strides between the hurdles in the 120-yard event he should take seven be-

tween the hurdles in the 220-yard event. As a beginner he should not try more than three of these hurdles, going over them no more than five or six times in a single day. In other respects he should adapt the instructions I have given for the high hurdles to the low hurdles. After he has mastered the form for eight hurdles he will be ready for a race. He will need the same exercises for hardening the muscles, developing his speed, etc., as for the high hurdles. If he is training for both hurdle-races he should master the high hurdle first, varying his training for it with working over the low hurdles.

I would particularly emphasize the advantage of taking seven strides between hurdles in the 220-yard event. Some short men who try the hurdles take nine strides between hurdles, but to do this they are obliged to cut their stride. Seven is the number which all the champions take, and it calls for a good, long-striding man with plenty of endurance to finish the last three hurdles. I have seen a great many races between men who took seven strides and men who took nine strides between the hurdles, and I have never seen

a nine-stride man beat one who took but seven strides, other things being equal. I have seen but one good man who took but eight strides, and although he was very clever and fast he could not beat a good seven-stride man in a race.

On account of the greater distance between the hurdles in this event, there are usually more falls in the low than in the high hurdles. This is because the men run faster and cannot judge the distance between the hurdles nor the position of the hurdles until they are upon them. In order to take each hurdle in the proper stride the athlete must clear 13 feet in his jump and then cover 47 feet in seven strides. It is usually easy enough to do this for the first six hurdles, but then a man grows tired and it takes a great deal of strength to finish the race without a fall.

## CHAPTER XI

## RUNNING BROAD JUMP

THERE is no particular build required of the boy or man who would make a good broad jumper. I have seen champions who were heavy and tall and I have seen just as good ones light and short. Frank Irons, who won the Olympic championship in 1908, weighed less than one hundred and forty pounds and stood less than five feet seven inches in height. A. B. Gutterson, who won the championship in Stockholm in 1912, is a six-footer and weighs nearly one hundred and seventy pounds. In spite of the fact that good broad jumping requires plenty of speed, the holder of the world's record of 24 feet 11¼ inches, Peter O'Conner, was a very poor sprinter; but, in spite of these differences in build and in ability to sprint, it still remains true that the majority of our champion broad

jumpers are big men with a good turn of speed. A. C. Kraenzlein, holder of the intercollegiate record of 24 feet 4½ inches, answered this description perfectly. He stood six feet in height, weighed one hundred and seventy pounds, and could run 100 yards in 10 seconds.

The equipment for the running broad jump is simple enough. A joist, preferably eight inches wide, is set firmly in the ground, its top being level with the top of the ground. The earth should then be dug up in front of this joist to a depth of from six inches to a foot, and for a distance of from twenty to thirty feet, according to the age and ability of the jumpers. The joist is called the "take-off," and in competition the jumper is not allowed to have any part of his foot over this board. Each competitor is allowed three trials, and then the best three or four men, according to the number allowed in the finals, are permitted three more trials each. Each competitor is credited with the best of his jumps. The measurement of a jump is made from the outer edge of the joist to the nearest break of the ground made by any part of the

person. Usually a line is drawn six feet in front of the take-off board, and stepping over such line in an attempt counts as a balk. Three such balks count as a try. For three fouls the jumper is disqualified.

The beginner must be very careful not to develop lame muscles. For this reason his first work should be a combination of running and jumping, with not enough of either to make the muscles sore. The first day's practice should consist of not more than five or six jumps, none of them hard. Then the athlete should rest a day or two, perhaps practising a little sprinting, but not doing any more jumping until the first soreness has worn off. The first essential the broad jumper must master is the art of hitting the "take-off" properly. By this is meant striking the plank set into the ground squarely and without fouling. Until the athlete learns how to do this accurately he should forget all about distance, contenting himself merely with learning how to get his run-down so as to strike the take-off without being obliged to overreach, to shorten the stride, or to slow down the speed.

To master this, the athlete must find the exact distance he covers in his last six strides. He will find that if he walks back 12 paces from the take-off board, which will be between 35 and 40 feet, somewhere between these distances he will find the right mark from which point six strides will bring him squarely to the take-off. After getting this point approximately by practice he should mark it with a piece of paper or some other object, and then go back at least the same distance, though a little more is better for the start of his run. This will enable him to reach the take-off at full speed, and without being obliged to get up his speed too quickly. The athlete should be going at full speed by the time this point is reached and should be able to strike it so that in six more strides the jumping foot will hit the take-off board squarely. This is something which should be thoroughly mastered, because if a mistake is made the athlete's stride will be too long or too short, and this will require either that he overrun the board and commit a foul or it will slow down his speed and seriously shorten the length of his leap.

The greatest care should be taken to learn what is the proper speed for the athlete to get the right elevation. If the jumper runs too hard he cannot get up into the air and secure the maximum distance to his jump. Running too slow is quite as bad. The athlete should remember that he must be going at his top speed just as he strikes the take-off, but not too fast to enable him to spring well up into the air. I have frequently found that beginners may force themselves to get the proper height by practising with a low hurdle or some other object placed at a short distance in front of the take-off. Great care should be taken, however, that this object is not something which will injure the jumper. Getting up into the air is something which will come only with practice. He should learn to strike the take-off squarely, so that he will spring high into the air on the rebound.

After the athlete has learned how to leave the take-off and spring into the air he should devote his attention to getting the greatest possible distance to his jump. Since the jump is measured from the inside of the take-off to the first break in the ground, great care

should be taken to light properly on the feet, so that neither the hands nor any other part of the body falls back of where the heel strikes, or the chances are that 2 or 3 feet will be taken off the jump.

In order to get the greatest possible distance to the jump the feet should be worked forward with the hands outstretched to keep the body properly balanced. Some jumpers work their feet "scissors" style. This gives them the impression of taking a step in the air. Myer Prinstein, of Syracuse, was able to get almost an additional foot to his jump in this way. Roy Mercer, of Pennsylvania, also jumps in this style. Kraenzlein, however, did not use this extra kick and got his distance by his natural spring and speed. The same was true of Gutterson.

The beginner must be careful not to bruise the bone in the heel, which he will do if he strikes the take-off board too hard without the proper kind of shoes. Regulation jumping shoes, with short spikes in the heel, are best for this event. Ordinary running shoes may be used if the spikes are not too long, and a strip of felt is sewed beneath the heel.

## CHAPTER XII

## RUNNING HIGH JUMP

THE running high jump is an event which calls for a good supply of natural spring and strength, though the high jumper need not necessarily be a large man. In spite of the fact that two of the best high jumpers who ever lived, M. F. Sweeney and W. Byrd Page, were small men, it is a rule that the tall man has a decided advantage in this event. Until 1912 Sweeney held the world's record of 6 feet 5⅛ inches, while Page held the collegiate record for nearly thirty years. Sweeney was only 5 feet 8¼ inches in height, yet he could jump 9 inches higher than his own head. Page was 2 inches shorter than Sweeney, in addition to which he suffered many years with a slight deformity in one leg. But in spite of these two exceptions the best of our high jumpers have been tall men, the majority being from 6 feet to 6 feet 3 inches in height.

The equipment for the high jump is very simple. Two uprights, movable ones being the best, are placed about 6 feet apart. Holes, beginning at a point about 3 feet from the bottom, are bored in them 1 inch apart. Into these holes pegs are inserted to hold the cross-stick over which the athlete jumps. In competition each jumper is allowed three trials at each height, each competitor making his attempt in the order of his name on the programme. Then those who have failed have a second trial in regular order, and those failing in this trial a third and final trial. Each competitor is credited with the best of all his jumps. A line is drawn 3 feet in front of the bar and parallel to it, known as the balk line, and stepping over it in an attempt counts as a balk, three such balks counting as a trial. Displacing the bar also counts as a try.

I should start my instructions about high jumping with a word of caution. The beginner should not try to clear the bar with what is known as the "scissors jump." By the scissors jump I mean this: suppose a man takes off from his left foot. He kicks his

right leg out in front and high over the bar, following with the left leg in the same manner, and lighting on the right leg. To prevent this, he should make it a rule always to light on the same leg from which he jumps. This will make it impossible to use the scissors jump. At first the athlete will be able to clear a greater height with the scissors jump, but he can never be a champion with this form, for I have never seen an athlete using the scissors jump able to clear more than 5 feet 10 inches.

The ground in front of the bar should be dug up so that there will be a soft place in which to light. This pit should be filled with sawdust, but if that is not available, soft earth, kept dug up continually, will do.

In high jumping the object is to throw the entire body up to and above the normal level of the head, and then to get the body across the bar without touching it. To do this will require long practice, and the beginner should not try for height at the start, but devote his attention to acquiring the proper form. Height will come fast enough then.

Although there are certain principles which

all high jumpers observe, there are any number of styles, or "lay-outs," as the jumpers term them. Style is pretty much a matter of individual taste, and I have always found it best to vary my methods of coaching to suit the individual. M. F. Sweeney had perhaps the most perfect form for a high jumper. George Horine, of Leland Stanford University, who is now credited with the world's record, 6 feet 7 inches, had a style peculiarly his own, but it was not one which I would advise the average boy to imitate. Horine himself had no success with it in the severe competition at the Olympic games. Alma Richards, who won the high jump at Stockholm, had an equally peculiar style, and, like that of Horine, not suited to the average boy. Richards almost rolls himself into a ball as he clears the bar. He possesses the most abnormal spring I have ever seen in a human body, and it was this which enabled him to clear so great a height with his peculiar style.

In this book I propose to outline the form best suited to the average man. We shall assume that the candidate jumps from the left foot. In this case he should run toward

the bar from the right, and it is usually best to make a slight curve as the bar is approached. The jump for the bar should be made at a point from 3 to 6 feet away to suit the build and style of the individual athlete. The right leg is kicked high in the air, and at the same time the spring is made from the left foot. As the athlete rises into the air he turns the body to the left, at the same time jerking the left leg and hips high and out so that he will clear the bar at the greatest possible height.

There is certain to be more or less variation in the way the turn is made. This depends upon the individual, and I should strongly advise all beginners to study closely the form of champions at every opportunity. Seeing how another man does it will often be of more help than printed directions. In particular the athlete should devote a great deal of attention to acquiring form, learning how to get the left leg and hips out of the way before trying for height. The fault most common with high jumpers is that of hitting the bar with the buttock. This can be greatly overcome if the jumper will be conscious of the effort of trying to lift the but-

tock high in the air. Learning this will add 6 inches to the height of one's jump.

There are some high jumpers who have a tendency to dive over the bar. The rules provide that the head and shoulders must not be over the bar before one foot is across. It should be remembered that the instructions I have given deal with the man who jumps with the left foot. If it is more natural for one to jump from the right foot he should reverse the instructions I have given on this point.

The take-off should be given almost as much attention as the style in clearing the bar. This is particularly true if one expects to get into the championship class. The take-off for the high jump is practically the same as for the broad jump. The most popular take-off is a point eight full strides, or from 24 to 30 feet, from the bar. This should be a point such that, if the athlete jumps from the left foot, starting from this mark an even run to the bar will bring his left foot to the correct point from which he springs. After this take-off has been determined he should go back double this distance so that his run will bring him with the proper foot to the first

mark, from which point he will increase his speed to the maximum just before he reaches the bar. He should be careful, however, not to run at the bar too hard. It will be found best to take long strides as the bar is approached and reach it with just the speed that will give him the greatest spring. It will take a great deal of practice to get this right, but it is very important and will repay the jumper in the end.

The athlete must use his own judgment about the amount of work he should do at the start. Above all, he should be careful not to overdo it. It is always best to stop when he feels able to do some more jumping rather than run the risk of injury or straining the muscles.

## CHAPTER XIII

## THE POLE-VAULT

THERE is no event on the track and field programme that results in a better all-around development of the body than the pole-vault. It builds up the arms, shoulders, and back, and although the upper part of the body is brought most into play the legs are not neglected. However, it is an event which requires patient study and practice if one wishes to become proficient in it.

The first thing the pole-vaulter should consider is his equipment. This consists of a pole with which to vault, two uprights, the cross-bar, and a plank to be sunk in the ground. For the beginner an ash pole is best because it is strongest and less likely to break. If it does break it first gives warning by several cracks. The beginner should be content with a pole 14 feet in length. If it is made

of ash another piece 2 feet in length can be spliced in at the upper end. However, this extra length will not be necessary for the beginner.

The uprights are made much after the style of those used in the high jump, with holes bored 1 inch apart into which pegs may be inserted for the gradual elevation of the cross-bar. The plank in the ground should be at least 6 feet in length. It is sunk 12 inches in the ground leaving an edge of about 2 inches above the ground. In front of the plank is dug a small hole so that the force of the pole as it strikes the ground will be against this plank. The hole may be from 4 to 6 inches in depth. Care should be taken to strike it properly so as not to give the body an undue strain. Careful attention must be paid to the landing-pit, which should be filled with sawdust and kept loose. If sawdust cannot be obtained care should be taken to have the dirt loose and dug up frequently. Failure to attend to this detail is sure to result in sprained ankles or something worse.

The beginner should use the same care in

mastering the correct form for the vault as in the broad jump, high jump, and other field events. Before any attempt is made at height he should learn the proper form to clear the bar. After he has mastered this the height can be increased, but not before. For the beginner I would suggest that the bar be placed at 6 feet or at some height which can be cleared easily. The beginner should first practise an easy run to the bar to learn how to strike the pole properly into the hole. I assume that the vaulter is right-handed and that he is strongest in his right arm. The pole should be held with the strongest arm above, the hands about 2 feet apart and the thumbs firmly grasping the pole, the little finger being lowest on both hands. With the bar at 6 feet it will be found that the top hand should grasp the pole 8 feet from the bottom.

The vaulter is now ready for his first attempt to clear the bar. He should take an easy run of about 30 feet, keeping the eye on the hole into which the pole is to be inserted. Under no circumstances should he watch the bar.

As the pole strikes, the vaulter swings into the air, holding the pole with a firm grip. Then he should let the pole swing him over the bar just as a man would jump a fence by placing his hands on the top rail. He should make it a point to turn easily in the air from the right to the left, never hurrying the turn. Right here the vaulter should be cautioned not to lose his nerve in going up, and under no circumstances to let go of the pole. To do so will give him a bad fall. The vaulter is always safe as long as he holds onto the pole. As soon as the athlete has made sure of striking the hole properly and making the turn in the air he can put the bar up a few inches and try for a greater height.

Care should be taken to learn the proper method of landing in the pit. The vaulter should make it a point to light on his feet, and if all the details I have given are carefully observed, and the athlete learns to light on his feet at the start, he will have no further trouble. If he falls on the back or side he is liable to serious injury.

One of the most difficult things to learn in the pole-vault is what is called the "slide."

By this is meant the art of slipping the left hand up against the right just before the pole strikes. To learn this the athlete should practise slipping the hand a little at a time with the bar at a low height. Each time the hand is slipped it must again grip the pole firmly, hold on, and not be allowed to slip back as the body goes over the bar. The left or lower hand should be made to do as much work as the upper, but it will take lots of practise to master this. Some vaulters slip the lower hand close against the upper hand; others leave a margin of 2 or 3 inches. Acquiring this knack is worth everything in pole-vaulting, for without it it is absolutely impossible to clear the bar at a respectable height.

When the vaulter has learned how to make the turn as he clears the bar and also how to slide the lower hand against the upper, he should devote his attention to the take-off, which is just as important as in broad jumping. He should walk back about 12 ordinary paces from the plank. Here he should make a mark and see if a run from this point will not bring him so that he will strike the take-off properly. If not, a point a little

nearer or farther will make it right. Then he should go back 12 more paces and come up to this mark at an easy run. Care should be taken to see that the jumping foot strikes this mark. If it does the vaulter is ready for work.

The height at which the pole is held depends upon the height of the bar it is desired to clear; therefore the higher the pole is held the farther back from the take-off must be the point to be struck by the jumping foot in running to the bar. When the pole is inserted in the hole, and the vaulter's arms extended, a triangle is made by the pole, the athlete's body, and the ground. Just before the jump is made the vaulter will be standing for an instant on his toes with his arms extended. The angle made by his body and the ground should be nearly a right angle. The vaulter should exercise care not to jump from a point too far away from the pole or he will swing in against it, and if he gets too close to the pole he will receive a jolt backward. The object is to get a full swing upward and forward without any undue jolt from the pole as it strikes the ground. This will require

lots of practice, and the higher the vault the more difficult it is to get it right. If the athlete is having trouble with this it is caused by one of two things: either the slide of the hand is not made quickly enough or the distance from the point where the foot strikes the ground has not been properly determined.

The point where the slide is made varies. Some vaulters begin quicker than others. As a rule, it will be found, assuming that the jumper takes off from the left foot, that the time to make the slide is just as the pole is raised and the right foot is striking the ground for the last time. Then the hand is lifted upward quickly, gripping the pole as hard as possible to overcome the jolt caused by the pole striking the ground. The take-off foot should be nearly in line with the point where the pole strikes. This is something which the beginner should take great pains to master.

The beginner should be cautioned not to get the legs over the bar too quickly. The legs cannot be gotten over the bar until the pole reaches it; therefore the vaulter should not pull in too much of a hurry or he will stop the pole on the way up. Care should

also be taken not to let go of the pole. The vaulter must use his eyes all the time and get as high on his hands and arms as possible. When the body and legs are over the bar the hands should be thrown up and back from the bar. As the hands are released from the pole it is given a little push and will fall back naturally.

The pole-vaulter must know the rules of competition and what constitutes a foul. In the intercollegiate rules a line is drawn 15 feet in front of the bar and parallel therewith. Stepping over this line, which is known as the balk-line, in any attempt counts as a balk, and two such balks constitute a try. Displacing the bar or leaving the ground in an attempt also counts as a try. A vaulter should know that during his vault he cannot raise the hand which was uppermost when he left the ground to a higher point on the pole, nor can he raise the hand which was undermost to any point on the pole above the other hand. This constitutes climbing the pole and is illegal. Each competitor is allowed three trials at each height, and if finals are held those who won places are allowed three more

trials at each height. Each competitor is credited with the best of all his vaults.

To be a good vaulter requires strong arms and a strong back. There is nothing better for developing this than work in a gymnasium on the parallel bars. Care should be taken not to do too much at the start and always to take plenty of rest when the muscles become lame. In vaulting the heel especially should be protected either with a little soft felt or rubber. Too much work is sure to injure the shins and legs.

The climax of the vaulter's efforts is a violent pull of the arms and the raising of the body into the form of an arch. It is an event which calls for lots of training and scientific study; but it is one of the most fascinating of field events, and perseverance in it will be well rewarded.

## CHAPTER XIV

## THE SHOT PUT

For a boy or young man who wishes to develop the upper part of his body, putting the shot is an ideal exercise. There are many boys fond of track and field athletics who do not have the physical build or that quickness of action to enable them to become expert at the track events or skilful at the jumps or pole-vault. Possessing a good, strong frame, they are likely to find the weight events more suited to them.

Every boy who takes up either of the weight events with the idea of becoming a champion should bear in mind that very rarely does one become a champion both at putting the shot and throwing the hammer. While both are weight events, they call for radically different styles of training. Proficiency in one is obtained at the expense of proficiency in the other, and more often training for both of

them prevents the athlete from excelling in either. In putting the shot one develops the "pushing" muscles, while throwing the hammer is a "pulling" exercise. Therefore, whichever event is selected the athlete should practise it to the exclusion of the other.

Shots are made in three weights, 8 pounds, 12 pounds, and 16 pounds. The 8-pound shot is intended for young boys and should be used by all boys fifteen years of age and under. Boys of sixteen and seventeen years should limit themselves to the 12-pound shot and should not try the 16-pound shot before reaching the age of eighteen years. This caution should be carefully observed because success in this event cannot be obtained by a boy who puts an undue strain upon his arm before attaining his growth.

The shot is put from a 7-foot circle. Four feet of the circumference of this circle has a toe board 4 inches in height from which the shot is put. The rules of shot putting provide that each competitor shall be allowed three puts, and in case of finals the best three or four men are allowed three more puts. Each competitor is credited with

the best of all his puts. The put is measured from the nearest edge of the first mark made by the shot to the point of the circumference of the circle nearest such mark. Foul puts, which, of course, are not measured, can be made in three ways:

(1) Letting go of the shot in an attempt.

(2) Touching the ground outside the circle with any portion of the body while the shot is in the hands.

(3) Touching the ground forward of the front half of the circle with any portion of the body before the put is measured.

In learning to put the shot the beginner should proceed slowly. First of all, he should learn how to hold the shot. It should be settled firmly in the palm of the hand close to the root of the fingers. At the very beginning the athlete should be careful to avoid the fault most common to beginners, that of "throwing" the shot. Every shot putter is bound to contract this fault and he should be on guard against it from the very start. Throwing the shot as opposed to putting it constitutes a foul, in addition to which it is a very severe strain on the arm. Throwing

the shot leads one to depend too much upon the arm and not enough on the leg and body drive. When the shot is thrown instead of put it is impossible to get the weight of the body behind it. I can best explain the difference between the throw and the put in this way. When the shot is thrown the tendency of the athlete is to bend the head forward and throw the shot around the ear, as it were. This mistake should be carefully avoided and the shot should be put from a point under the ear and with the head up. If this position of the head and the arms is carefully borne in mind at all times the danger of throwing the shot will be greatly minimized.

The hardest thing to master in putting the shot is the final effort. In it when the shot is released every ounce of strength from the fingers to the foot is concentrated in one powerful drive. To co-ordinate all these things so that the correct elevation and direction are attained with all one's strength and weight behind the put is acquired only after long practice and infinite pains.

The quickest way to acquire the proper form is to master this final effort. If the beginner

can practise from a slightly elevated stand he will succeed in accomplishing this more quickly. Because this part of the exercise is the most important, I am explaining this effort before telling the shot putter how to move across the ring. After he has learned how to properly release the shot the preliminary efforts can be learned readily enough.

I am assuming that the athlete is right-handed, in which case the shot is put with the right hand. If he is not practising with a toe-board it is from a ring. The left foot is placed either against this toe-board or close to the circumference of the circle. Then the shot is settled firmly in the palm of the right hand. The right leg should be slightly bent at the knee and the arm so held that it feels strongest with the shot resting on the forward part of the shoulder close to the neck. The position here referred to will vary as progress is made. One's instinct will tell him whether or not he is holding the shot correctly. The left arm and hand should be extended at about the elevation, but not necessarily in the direction, the shot is to be put.

The athlete is now to learn what is known

as the "reverse," in which the final effort is made. The shot is put with an upward and outward heave or push. The body is quickly turned with the beginning of the motion so that the right leg will reach the point where the left leg was when the final effort was started. In this the left leg and left arm trail. In this action there is almost complete reversal of the legs and arms. This final drive is of great importance and should be practised faithfully until it is mastered. I should advise beginners to practise both with and without the shot, and more often without the shot.

Great care should be taken to keep the weight in front, because if it is put from a point too far to the side it places the strain unequally on the elbow and shoulder. When the athlete feels this strain he will know that he is putting the shot incorrectly, that he is half-throwing it and getting no assistance from the legs and body. After the athlete masters the correct way to hold the shot, how to balance the weight and reverse preparatory to make the final heave, he is ready to train for competition.

*From a photograph by W. G. Stuart.*

FINISH OF SHOT PUT.

Final effort of W. F. Krueger in putting the shot. Note how he has remained in the ring and is using arms and hips but still is following shot with full forces of his body.

The next part of the shot putter's instruction is to learn how to begin the movements and especially how to move across the seven-foot circle preparatory to making the final heave. Still assuming that the shot putter is right-handed, he takes his position just inside the circle and directly opposite the centre of the toe board or the point from which the shot is to be put. The effort starts with the right foot. The left leg may be slightly bent at the knee to suit the individual and at such an angle that the athlete feels strong and well balanced. Then the left leg may be permitted to swing upward and downward until the body has all the momentum it can carry. Some shot putters swing the left leg once around and outside the right leg for the same purpose.

At the correct moment the athlete jumps quickly forward across the ring with what resembles a falling motion. This movement should be made so that the left foot will strike close to the board, the right foot striking close to the middle of the ring. This will cause the shot putter to land in almost the exact position in which he started, only on

the opposite side of the ring. Immediately after the right foot strikes the ground the leg should be straightened, reversing the position of the arms, feet, and body, as already explained.

Care should be taken that when the final effort is made the weight of the body, particularly in the region of the hips, is well forward even if it almost causes the body to fall from the ring. Getting the hips up well enables one to get the full drive of the body and the legs behind the final heave. At first this may cause the athlete to foul, but it is something which can be readily corrected.

Beginners should be cautioned to try for a good height so that the right leg and body will be behind the heave. There will naturally be reason for discouragement at the start, but if perseverance is practised, and all the details I have mentioned carefully observed, the athlete will get surprising results. I would especially urge all beginners to carefully watch champions or experienced shot putters. In this way they will see how to correct many of their own faults and will discover errors in form which they did not know existed.

## CHAPTER XV

## THE HAMMER THROW

We are indebted to the Irish and the Scotch for this event. It was developed there and then transported to this country, where it has been brought to its highest state of perfection. Its popularity in the United States has been far greater than in England. Making it a standard event at the Olympic games helped to popularize it everywhere.

The hammer used in competition varies in weight like the shot. It may be 8 pounds, 12 pounds, or 16 pounds, according to the age and strength of the athlete. I should not advise throwing the hammer, even if the weight be only 8 pounds, for boys under fifteen years of age, and even boys under eighteen years of age should practise it sparingly and never attempt to use the hammer of more than 12 pounds in weight. A very strong

young man or a mature athlete may throw the 16-pound hammer without danger. For big men hammer throwing is an ideal exercise, because no matter how long they work they cannot injure themselves. In this respect it is different from any other event on the athletic programme, for the longer the athlete clings to it and practises with intelligence the more proficient he becomes. I have frequently known men to be champions at this event at forty years of age after practising more than twenty years.

The hammer is thrown from a 7-foot circle and the rules of competition are very simple. Each competitor is allowed three throws, and, as a rule, if finals are held, the best four men are allowed three more throws, each competitor being credited with the best of all his throws. The throw is measured from the nearest edge of the mark made by the head of the hammer where it strikes the ground to the point of the circumference of the circle nearest such mark. There are three methods of fouling, as follows:

(1) Letting go of the hammer in an attempt.

(2) Touching the ground outside of the cir-

cle with any portion of the body while the hammer is in the hands.

(3) Touching the ground forward of the front half of the circle with any portion of the body before the throw is measured.

There is one serious drawback to hammer throwing: it requires a big field for practice, and unless the athlete uses a wire cage there is always more or less danger to spectators and other athletes who may be using the same field. Various associations have considered the elimination of the event from time to time because of the danger which attends it, but it is so good an exercise that I should hate to see it eliminated. To my mind the Swedish Olympic committee came as near eradicating danger from the event as can be done when it compelled athletes to throw from a wire cage and as a further precaution ruled as fouls all throws not made within a specific angle. This rule made the event an interesting one and reduced its dangers seventy-five per cent. Every hammer thrower can reduce the danger of accidents by making sure that the handle is made of the very strongest kind of wire. The handle is 4 feet

in length over all, the wire handle having a double loop on the end, made of larger and stronger wire, with a swivel in the head of the missile to prevent the breaking of the handle.

I should advise the beginner to do the same sort of preliminary work as the shot putter. Just as the shot putter must learn how to hold the shot and to get his weight behind it, so must the hammer thrower learn to swing the missile around his head and get the proper elevation to it. To learn this he should first practise swinging the hammer about the head without making any throw. For this exercise he should let the hammer swing gently around the head, making it reach its highest elevation just over the left shoulder, and the lowest as it is passing the right hip. Continued practice will enable the beginner to get the right elevation unconsciously as the hammer swings about the head. Although the finished hammer thrower uses two turns before making the throw, the beginner, after he has acquired the proper method of whirling the hammer about the head, should first master throwing it with the single turn.

STARTING THE HAMMER THROW.

M. McGrath, Irish-American A. A. C., illustrating start of hammer throw at the Olympic games, London, 1908. Note how the hammer is held straight out from the hip.

When he can do this properly there will be time enough to master the double turn. As proficiency in making the turn within a small circle is acquired it is possible to use three turns, but this should never be attempted until one has thoroughly mastered the single and double turns.

After the athlete has learned how to swing the hammer he should practise releasing it without making any turn. To do this he should let the hammer whirl around the head three times and then still without making any turn release it over the left shoulder. He cannot begin too early to master accuracy in direction. It may take two or three weeks to learn how to swing the hammer and release it properly without making a turn, but the mastery of this is essential and should be learned faithfully.

Next, the athlete is ready to practise the single turn. Since form is an absolute necessity, it is not necessary to practise this within the 7-foot ring. The feet should be placed about 24 inches apart, the left foot thrown back about 6 inches in a parallel line, with the right foot gripping the ground firmly and

the knees bent slightly. Then the hammer should be swung three times around the head, the athlete pivoting on the left foot, care being taken to keep it firmly on the ground until the right foot is well around. Then the left foot leaves the ground for an instant making a small part of the turn. At the same instant the right foot grips the ground and the heave is given the hammer, which is thrown as high as possible over the left shoulder. In actual competition the athlete is throwing from a ring and the beginning of his throw is made with the body facing opposite to the direction of the throw. Thus, after having made the single turn the athlete will find himself in virtually the same position as that from which he started.

The turn should be made quickly so that the body will be ahead of the hammer. If the turn is made slowly and the hammer completes its circuit too quickly it will be impossible to get the full strength of the body into the throw. Great care should be taken to make sure that the weight is held straight out over the right hip when making the turn *and* not to forget to pivot on the left foot.

After the athlete has learned to throw fairly well with one turn he should try the double turn, that is, to spin around twice before letting go of the hammer. Two turns are made exactly like the single turn, the purpose being to increase the momentum of the body. The athlete's greatest difficulty in mastering the double or single turn, as the case may be, will be to stay within the 7-foot circle. Unconsciously, he will find himself taking more room for his turns than he needs. In his practice he will find it a great help if he can keep in his mind the picture of himself spinning around on some small object. I have seen hammer throwers who mastered the double turn by trying to spin around on a penny, and have seen some who could execute the double turn while using hardly more than half the circle. This is something which will come only with practice:

The following general directions will be valuable to the beginner:

(1) The leg which does the throwing is the right leg.

(2) It is the right leg which goes around the left, not the left which goes around the

right. The left is the pivoting foot, and the further it is from the right before starting the turn, or at any time during the turn, the longer it takes to make this turn properly.

(3) The athlete should not make too big a turn or he will find himself pulled off to the left. If he is pulled off to the left it is because his turn is too big or because he does not come around far enough on the first turn. In this case he should draw the left foot back a little before the start. This will let the hammer come around the required distance. The left foot must be drawn back before the hammer leaves the ground and never after the hammer has begun to swing around the head. This is a mistake which some beginners make.

(4) The athlete should grip the ground as firmly as possible with the left foot at the end of the first turn. This foot should remain on the ground as much as possible because it holds the body in the ring.

(5) The throw should be made over and not under the left shoulder, bearing in mind that the higher the throw without pulling the body out of the ring and forward the

THE FINAL SPIN.

John Flanagan, former world and Olympic champion, illustrating the correct method of spinning on the left foot, getting the hammer fully extended and yet keeping the body under absolute control just before releasing the hammer over the shoulder.

greater will be the distance gained and the less the danger of fouling.

(6) In starting the throw the hammer should swing around the head three times, its momentum being increased with each throw.

The hammer throw is an event which I would strongly recommend to all large men, because it makes them active and quick on their feet, besides being a splendid body developer. In addition to following closely the instructions I have given here, the beginner will receive much assistance by observing the form of experienced hammer throwers, because a study of their methods will frequently enable one to overcome faults of style unconsciously acquired.

# CHAPTER XVI

## THE DISCUS THROW

THROWING the discus is an event which has become popular in this country only since the revival of the Olympic games. It is an addition to the weight-throwing events on our athletic programme. Like the hammer throw, it has not gained a very strong hold in schools and colleges because of the difficulty in finding a field large enough to practise it faithfully. At this writing the Inter-Collegiate Association of Amateur Athletes of America has not yet put it on its championship programme, although it is one of the events on the programmes of the Western Inter-Collegiate Conference Association, the New England Inter-Collegiate Association, and some minor college associations.

Before one takes up discus throwing he should acquaint himself with the regulation

discus which, according to the I. C. A. A. A., must weigh not less than 4 pounds $6\frac{4}{10}$ ounces. Its largest dimension is a circle of a diameter of not less than $8\frac{5}{8}$ inches, and not more than 9 inches. It must be symmetrical in shape, each side being a counterpart of the other side. Likewise it must be smoothly finished, the surface and circumference having no projecting points, indentations, or sharp edges. The discus thrower should make it a point, therefore, to secure the regulation discus, because I have seen many records disallowed because the rules regarding the exact weight and shape of the discus were not exactly conformed to. The discus is thrown from a 7-foot circle, and the same rules as to fouling are observed as in hammer throwing and shot putting. One of the best requisites of a good discus thrower is to have a big hand with strong fingers. To hold it properly the hand should cover as much of the outer surface of the discus as possible, with the fingers firmly gripping the lower edge so that when it leaves the hand it will skim along through the air with a twisting motion. Particular care should be taken to get the proper ele-

vation. If it is too high the discus will turn broadside against the wind and will tumble over and over without getting much distance. Ability to get the correct elevation and to start the discus at the right angle from the hips is of prime importance.

To prepare for the throw the athlete should stand with the feet well apart, balancing the body nicely on the legs and with the arms extended wide over the hips. The discus should be held nearly level. After making sure that it is firmly gripped it should be swung a few times from left to right so that it will have sufficient momentum before its release. Then the athlete should pivot quickly on the left foot. The instant the right foot touches the ground the heave is made, the left foot swinging around and striking the ground so as to keep the body from going out of the ring. On this turn the hand holding the discus is held well out over the hips, and the instant before it leaves the hand it must be pointed at just the right angle to make it sail through the air.

The athlete should go through a great deal of preliminary training in this event, first

HURLING THE DISCUS.

John Garrells, University of Michigan, former world's champion in this event, taken with every muscle under control and concentrated for the final effort.

learning the proper way to hold the discus and then to get elevation and distance without making a turn.

It should be remembered that the new rules require fair throws to be made within a given angle. This means that direction is very important. After these points have been mastered it will be time enough to practise the turn which will greatly increase the distance of the throw. Such men as Martin Sheridan and James Duncan, the two Americans, and Taipale, of Finland, the Olympic champion, were champions because they first mastered the seemingly small points of discus throwing. After the form has been properly acquired the distance will take care of itself.

## CHAPTER XVII

## THE JAVELIN THROW

THE javelin throw is an event for which we are indebted to the Greeks, who made it a feature of the Olympic games. It is far more popular in the European countries than in the United States; but within the last few years some of our colleges and athletic clubs have introduced it, so that it promises to become quite popular, provided the Olympic Council keeps it on the programme.

The javelin is made of wood, usually of ash or hickory, the latter wood giving the best service. The official javelin is 8 feet 6 inches in length, and weighs 1.6 pounds. It has a metal point, and about the centre of gravity a grip is formed by binding whip-cord without knots. At the grip the javelin is about one inch in diameter, and tapers down to about one-half inch at the rear end.

Unlike other weight events the javelin does not require a ring. It is thrown at the conclusion of a free run, which is taken just as in the running broad jump. This run is usually from 15 to 20 yards. A line is drawn back of which the javelin must be thrown. The length of run allowed the competitor is any distance he desires.

The final effort in throwing the javelin is very much like that of putting the shot. In this final effort the body and feet are reversed exactly as in the shot put, the right foot striking the ground after the javelin is released. Beginners in throwing the javelin should practise the same preliminary exercises I have explained for putting the shot. The first essential is to master the form without a run, and after that is acquired the athlete can work for distance and take as long a run as he desires.

I am assuming that the athlete is right-handed. The javelin, therefore, should be caught at the grip, the thumb and little finger being under, and the three middle fingers on top. This is the firmest way to hold the javelin and make sure of the aim and direction.

Before he learns the scientific way to throw the javelin, the athlete should master a simple throw without either a run or the reverse of the body. As a prelimary the javelin should be gripped in the manner explained. Then the left foot should be raised just as in putting the shot, care being taken to see that the body is properly balanced. The javelin is then pointed upward, at an angle of about 30 degrees, the right arm holding the javelin so that the arm is almost parallel with it. Before the throw begins the right hand holding it should be extended as far back as possible, so that the full strength of the right arm and shoulder can be behind it. Beginners make the mistake of discharging the javelin without bringing the right arm all the way back. In this way they necessarily reduce the distance of the throw.

After the athlete has learned the proper way to hold the javelin, he should practise the reverse. This is the same exercise that is explained in the chapter on shot putting. The body is turned quickly so that at the end of the run the left and right feet change places, and the javelin is discharged with the right

HOLDING THE JAVELIN.

Lemming, of Sweden, Olympic champion, illustrating the proper method of holding the javelin.

arm and foot forward. The beginner should practise this until he has completely mastered it, after which he is ready to practise the run. Getting this run down correctly requires the same sort of preliminary practise as in the case of the running broad jump and pole-vault. The athlete should run from 15 to 20 yards, the object being to get the maximum amount of speed, but not so much that he loses control of himself when the final effort is made. A little practice will show the athlete the point from which he should start his run, and if this is carefully marked, he will be in no danger of overrunning the mark from which the throw is made.

I would caution beginners about doing too much at the start. Throwing the javelin does not tire the arm as quickly as putting the shot, and the beginner may, therefore, be inclined to overdo his work at the start. The first place to feel the strain is in the small of the back, though the shoulder muscles are also affected. The javelin is thrown over the shoulder almost as one would throw a base-ball. The thrower should never use a side-arm motion, because he will not be able to

control the direction, in addition to which he will shorten the throw.

The javelin throw has unlimited health-giving possibilities to whoever practises it faithfully. It builds up the shoulders and back, while the arms become well developed without becoming bulky. If properly indulged in it brings into play more muscles of the body than any other exercise I know. It furnishes a splendid exercise for those who do not have quite enough strength and weight for throwing the hammer or putting the shot, or who are not properly adapted for track events.

If used with moderation, I should say that it is likewise a good exercise for girls and young women.

# CHAPTER XVIII

## RELAY RACING

I KNOW of no better agency in developing track athletes than relay racing, a sport made famous in this country by the University of Pennsylvania's annual relay carnival. Its value is greatly enhanced because it is primarily a splendid exercise, it furnishes competition for a great many runners, and is attractive to spectators.

A relay team is composed of four runners, each of whom runs the same distance, except in a medley contest in which, by common consent, each relay may be a different distance. The relay distance most popular in this country is the 1-mile, in which each man runs 440 yards. To further vary the sport relay races are frequently arranged for 2 and 4 miles. In the 2-mile relay each runner goes half a mile, and in the 4-mile events each runner a mile.

The original idea of a relay race was the carrying of a message, each runner passing it on to his successor. In this way mails were once carried in the far West, and messages have been similarly relayed in times of war. The Swedish Olympic Committee made an improvement in the relay races at the Olympic games held at Stockholm in 1912. The American college method had always been for each runner to touch hands with the man who followed. This touch-off is made within a 20-foot zone in front of the starting line. The Swedes improved upon this by substituting for the touch-off the passing of a baton, a piece of wood about a foot in length which each runner had to hand to his successor within the prescribed zone. This change did away with the problem, often difficult, of determining whether or not a runner was actually "touched off" by his predecessor. It likewise revised the original idea of carrying a message. The American athletes at Stockholm were unfamiliar with this sort of relay racing, and the 400-metre team was disqualified in the trials for failure to pass the baton within the prescribed zone. With a little

practice the 1,600-metre team developed sufficient skill to transfer the baton properly, and won easily. The substitution of the baton for the touch-off has been adopted by the Inter-Collegiate Association of Amateur Athletes of America and looks like a permanent change and a good one.

Since I have already explained in the foregoing chapters how to train for the quarter-mile, the half-mile, and mile runs, which form the basis for most relay racing, I need not refer to this phase of training here. The better one can run these distances the more valuable will he be to his relay team.

Relay races are frequently won or lost by a poor arrangement of the runners or poor work in touching off or passing the baton. There is no set rule to be followed in arranging runners according to their speed. On more than one occasion I have rearranged the order of a team during the progress of the race; but as a general rule it is best to reserve the fastest man for the last relay, using the next fastest for the first and sandwiching the slower men in on the second and third relays. This arrangement is based on the

theory that it is best to start the race with a man who can hand over a lead to a slightly slower runner. If the slower man gets the start he will not be bothered with having to fight his way through a number of runners, and the chances are that he and his successor, who is likely to be a man of about the same speed, can give their last runner at least an even start. It frequently happens that it is a good thing to put the fastest man on the third relay to run his opponents off their feet and give the last man a substantial lead.

One of the most common mistakes relay runners make is that of starting off with too great speed, particularly if an opponent has been given a slight start. A relay runner, above all others, should be a good judge of pace. In particular, he should avoid running himself off his feet in the first 200 yards. The excitement of the race will probably carry him a little faster than he has been accustomed to run, but he should take care that it be not at a 100-yard pace, and he should remember that it is not necessary to overtake his man within the first 150 yards. I have seen a great many races lost because one of

the intermediate runners ran himself off his feet in the first part of his race and then lost so much distance in the last 100 yards that his team was hopelessly beaten. This advice about the arrangement of runners applies also to the 2 and 4 mile relays, though not with as much force as for the 1-mile event.

All relay runners should take particular care to master the art of touching off or of passing the baton, whichever is used. For the purpose of transferring the baton a 20-foot zone is marked off in front of the starting line, and the transfer may be made at any point within this zone. Under no circumstances is the runner allowed to run back to meet his team-mate; but he should be in motion forward when his team-mate finishes so that he will lose no time in getting away.

All the rules of track racing which I have already mentioned apply to the relay. A good start is worth everything, particularly in a mile relay. To get the pole means a great deal, but the runner should not risk having his team disqualified by committing a foul at the start. At the same time, he should be wide-awake and not permit him-

self to be crowded to the rear on the first turn. I have seen more than one relay team beaten because of this lack of aggressiveness on the part of the first runner.

## CHAPTER XIX

## THE ATHLETIC HEART

ALTHOUGH we hear less about it now than we once did, nearly every athlete will be told at one time or another that participation in athletics is likely to shorten his life—that it will give him the "athletic heart." By this is meant that such exercises as running, jumping, and rowing will increase the size of the heart to such an extent that it will be a menace to the health in after life. This is a belief held by a good many well-meaning persons, and I wish to discuss it in an unprejudiced manner.

Of course there are some boys and young men with physical defects who ought never to take part in vigorous athletics. The advice of a competent physician should always be secured in such cases. But if a boy is physically sound he has nothing to fear, but

everything to gain, from athletic competition. Indeed, I have seen so many cases in which weak and undeveloped boys and young men have become strong and well through athletics that I know the dangers of the so-called athletic heart have been terribly exaggerated.

What convinces me more than ever of the soundness of my contention is that I have never known a single athlete whom I have trained or with whom I have worked, either in professional or amateur athletics, who died from what some physicians term the athletic heart. In my younger days I trained many of the best long-distance walkers and runners, men who ran or walked from sixty to seventy miles a day in preparation for their athletic contests. If the declaration of those who believe in the dangers of the athletic heart were to be accepted, most of these men should have dropped dead on the street long ago. But the fact is that many of them are now between sixty and seventy years of age and in perfect health. I have not been able to trace one death to the athletic heart.

The heart is an automatic organ, and as such it more readily adjusts itself to the strain

put upon it than any other part of the body. Naturally, constant exercise, such as running and rowing, will enlarge the heart, but it is an enlargement which takes place gradually and in the same proportion that the other organs of the body are enlarged. The larger and stronger the heart the slower will be its beats. In other words, a heart with a pulse-beat of 60 to the minute will do the same amount of work as another heart with a pulse-beat of 72. But why should one be concerned if his heart, beating 60 times to the minute, sends the same amount of blood through his arteries as his comrade's heart, beating 72 to the minute?

In proof of my theory let me quote the results of some experiments which I made with one of the most famous heart and lung specialists in the United States. Our purpose was to determine the immediate effects of vigorous competition upon two classes of men, the trained athlete and the untrained student. First, we took a trained champion mile walker. The physician drew a diagram of the man's heart on his chest, then this man walked a mile in 7 minutes. His heart was examined immediately afterward. The

examination showed that the heart had expanded three-eighths of an inch. Next we took a student who had had no athletic training, and we walked him half a mile in 6 minutes, hardly half the speed of his predecessor. His heart was similarly examined, and at the conclusion of his half-mile walk we found that his heart had expanded 1½ inches —more than double the expansion noticed in the heart of the trained athlete. We performed a similar experiment with a trained mile runner who ran a mile in five minutes and an untrained student who ran half a mile in three minutes. The results were virtually the same.

Next we took a short-distance man who had been in training for two seasons. A fast run of 150 yards hardly affected his heart at all, while a run of the same distance at no more than three-fourths of this speed completely exhausted a man who had done no athletic training. During our investigations we noted the effects upon the men who were addicted to the use of cigarettes, and we found that the effects of brief but vigorous exercise upon the untrained athlete who smoked, and

the one who did not were far more distressing to the former.

I have made a very careful study of this question from the standpoint of medicine and applied athletics. Not only have I kept a careful record of the effects which athletic competition has upon the average boy, but I have obtained the testimony of athletes who were also physicians. The consensus of their testimony is that the athlete who takes good care of himself and does not acquire the habits of drinking and cigarette smoking has absolutely no reason to fear any evil after effects from the so-called athletic heart. On the contrary, a system of sane athletic work is sure to strengthen the heart and make it less liable to injuries from sudden strain put upon it or from excitement.

I have had occasion to examine a good many former athletes from ten to twenty years after their active participation had ceased. I have always examined these men with some eagerness in order to learn what effects their withdrawal from athletics had had upon their hearts and constitutions generally. And I have yet to find a single case

in which an athlete who had a good heart when he was actively competing, and who lived a clean and sensible life after giving up his athletics, had the slightest complaint to make of trouble with his heart. But I have met scores and scores of athletes who said that they owed the healthy condition of their bodies to the athletic life they lived in school, college, or club, and the lessons they learned from it.

The principal danger an athlete must avoid is that of giving up his athletics too suddenly, living an indoor and sedentary life without taking the proper amount of exercise. Every man, whether he has been an athlete or not, ought to take a reasonable amount of exercise. I have always advised my athletes not to give up their athletics immediately, but to indulge moderately in the same or a similar kind of exercise to which they have been accustomed.

This brings me to a discussion of the personal habits which athletes should have. In order to win success on the athletic field and to lay a foundation for a good constitution, there are two important rules which should be observed:

(1) Do not smoke. If one has acquired the habit of smoking let it be confined to a cigar or a pipe, but neither of these should be indulged in during the training period, and one will be far better off never to cultivate the habit, and if it has been started to break it if possible. I hate cigarettes, for I have seen many boys and young men ruined by them. There is not a single good thing which can be said in their behalf. Shun them as you would a deadly poison. I could relate a good many incidents in which boys and young men seriously injured their lives through cigarettes. An athlete is the last person in the world who should smoke cigarettes, either in training or out of training.

I know that some athletes indulge in cigarettes during their training, and some are foolhardy enough to insist that they are not injured thereby. It is true that some athletes do smoke and continue to win, but in such cases they win in spite of the injury smoking does to the constitution. Such persons should consider how much better they would be if they refrained from smoking. Since the revival of the Olympic games I knew

one American boy who was a champion here, but who was beaten in an important Olympic final simply because he had contracted the habit of smoking cigarettes and was so vain of his ability as to believe that he could win in spite of it. He was warned often enough, but it required Nature herself to show him what a fool he had been.

(2) Do not use any kind of alcoholic drink. No man needs it, and no athlete who hopes to be a champion can afford to indulge in it in any form. Alcohol is a poison. It makes all the muscles of the body flabby and counteracts the good of physical exercise. An athlete who uses alcohol is simply tearing down with one hand what he builds up with the other through his exericse. It is a habit which grows stronger and stronger with use and, unless it is broken up immediately, it will eventually ruin the constitution of the strongest man. I always say to the man who cannot give up his habits of drink and tobacco that the athletic field is no place for him.

In my career I have encountered many men who were supposed to have heart trouble,

but who through a system of sane athletics entirely overcame it. Some years ago while at Yale I had among the candidates for the track team a youngster whose doctor had told him his heart was in bad condition and that if he took any kind of athletic exercise he was likely to drop dead. He had a mind of his own and a theory that some kind of exercise would benefit him. He wanted to try for the half-mile run, but I feared this exercise would be too violent for him in his present condition. I persuaded him to try for the mile walk, which would give him plenty of exercise but which he could drop at any time. He did not have very much success with this event but later began to train for the high jump. With this event he made phenomenal progress, and at one of the intercollegiate championships he did 6 feet 2 inches. He kept up his work after college, and when the war with Spain broke out joined the Rough Riders and was one of the first men over the breastworks at San Juan. The point I make about this incident is that this boy, instead of being killed by athletics, was completely made over by them. Possibly his heart was in poor con-

dition when he reported to me, but so was every other organ in his body. What he needed was some exercise to tone him up. And this is about all the treatment a great many other persons need who imagine that any kind of athletic competition will be fatal to them.

Several years before this I had another case. I was training a couple of men in whom a friend of mine was interested. This friend frequented the training-grounds a great deal and continually complained of a pain in his left side. He had been told that he had heart trouble and that, in consequence, he must not take any violent exercise. His father and brother had dropped dead from heart-disease, and he expected the same fate. I induced him to begin an easy course of exercise. At first it was confined to short walks. Next I persuaded him to limit his smoking to two cigars a day and to live the simple life, eating only such food as could be had at our training-table. The change in his condition was remarkable. After a few weeks of this life he had no pain in his side, and he could walk as far as any of us without feeling any

distress. What he did was to get rid of a case of chronic indigestion, which was the source of all his trouble. For years afterward he enjoyed the best of health.

I am not quoting these instances to make light of real heart trouble, but I do contend that a great many persons who imagine they are suffering from heart trouble are in reality suffering only from indigestion, too much eating and drinking, and not enough exercise. If every person could be induced to live a normal, healthy, athletic life half the doctors and hospitals in the country would go out of existence.

## CHAPTER XX

## INJURIES—THEIR PREVENTION AND TREATMENT

THROUGHOUT this book I have constantly cautioned against overindulgence in athletics, too severe a course of work at the beginning of one's training, and competition when not in good physical condition. The object of these warnings is to prevent unnecessary injuries. It has been my experience that the majority of strains and injuries received in athletics are the result of carelessness or overwork. If an athlete thoroughly understood his event in advance, knew his own physical weaknesses, and trained with common sense, he might engage in athletics for years without suffering any serious injury. But because athletes will not do this they are frequently bothered with sore muscles, strains, and other injuries which, while not necessa-

rily serious, are annoying and interfere with training.

The most common injury from which runners and hurdlers suffer is sore shins. When the novice begins his athletic training his tendency is to overwork, and if he is a runner, particularly a distance man, the calves of his legs will become very sore during the first few weeks. This is something which cannot be prevented in the case of a beginner, but if he works easily at the start, and when the muscles become sore rests a day or two, he will gradually work out this soreness. The man who has had several years of running experience will likewise be troubled with sore leg muscles during his preliminary training, but it will not be so severe as in the case of the beginner.

If the runner has the services of a trainer and rubber he will be properly cared for; but the boy who has no trainer can look after himself quite as well if he uses common sense. He should observe carefully what I have said about cleanliness and bathing after every work-out, and he can work the soreness out of his muscles to a great extent if, after his

training and bath, he will briskly massage the muscles of the legs, not neglecting the thighs. The purpose of this is to keep the muscles loose and pliable. In case they are very sore it would be well to massage them a little before going on the track. The principal thing to be borne in mind in addition to the treatment I have prescribed is to give the muscles their necessary rest. The athlete will make haste slowly if he endeavors to keep on training when it pains him much to use his legs.

Sore shins are the bane of all good distance runners and of most hurdlers. They are caused by an inflammation of the muscles attached to the shin-bone. In the case of distance runners they are usually caused by pounding too hard on the track or running on hard pavements. The beginner will escape such injuries if he can run on the turf at the beginning of his training, or, better yet, begins work in tennis shoes. Likewise, he should heed the warning that pain in these parts gives him. The best cure for sore shins is rest, and if this is taken at the beginning of practice the soreness will gradually disappear. But if the athlete attempts to force things at the start

he will develop a case of inflamed shin-bones which may compel him to give up all running. When this soreness begins to appear it will be greatly relieved by the application of hot-water bandages put on as hot as they can be borne. In severe cases a rubber bandage will help, and in the absence of the trainer it will be well to consult a physician.

The worst injury which a sprinter can sustain is a pulled tendon, by which is meant a strain between the two heads of the biceps muscles in the back of the leg. A sprinter will know quickly enough if he pulls a tendon, for if it comes in the course of a race it will throw him. In any event he will not be able to walk on this leg, and he should rest it immediately, using a crutch if it is necessary to get about. Of course he will have to give up all training until it is thoroughly cured, and it is very seldom that such an injury can be permanently cured without a rest of six months or more. In the event of such an injury the athlete should consult a physician.

Although I have had a number of such breakdowns, I have always contended that a

pulled tendon is avoidable. Usually it is the penalty which an athlete pays for entering a race either without proper training or too early in the season. The man who attempts to race during the cold or damp weather, or who sits down on the ground before a race, is usually the one who has to pay the penalty of a breakdown. Nine-tenths of such injuries are the result of the carelessness I have referred to.

It frequently happens that the athlete receives warning of the impending breakdown by a severe pain in these muscles, as though they were being unduly stretched. He should heed this warning immediately. Supporting the muscles with adhesive tape, supplemented by a rest, will frequently bring the leg around all right in a few days. Applications of hot water before retiring are very good for this pain. It is best for the athlete to sit in a tub of water as hot as he can endure for a few minutes at night, which will probably greatly reduce the pain.

## CHAPTER XXI

## FOOTBALL INJURIES

If American college football were of a more stable quality, and not subject to radical changes in the rules every year, it would be possible for me to devote some portion of this book to the methods of preparation for this game, because at Pennsylvania and Yale I was constantly associated with the football coaching. But I have had so many requests of late years for information as to my methods of treating football injuries that I shall devote a portion of this chapter to the latter subject.

I have very little sympathy with those who attack football as a brutal and dangerous game. It is true that at one time the game was more productive of injuries than it is now, but by far the great majority of those injuries were due to carelessness and other

preventable causes. Football is a strenuous game, I know, but under the new rules, and when men are properly trained, the possibility of injuries is reduced to a minimum. I have always contended that with the supervision football receives at the big universities it can be played with virtually no serious risk. In proof of this let me point to the fact that there has never been a fatal injury among the thousands of men who have played the game at Harvard, Yale, Pennsylvania, Princeton, and Cornell. The few fatal accidents, as well as nearly all the serious injuries which can be traced to football, are due to negligence on the part of players and coaches. The most prolific cause of injuries is that players will participate in games without sufficient training or when in an injured condition. I have always avoided accidents by refusing to let a boy or young man play unless he was thoroughly trained and free from minor injuries. Another frequent cause of injuries is the practice of letting immature boys play against teams out of their class. Such meetings are certain to result in injuries, and from my experience I know that practically

J. I. Wendell,
220 yds., 23 3-5 s.

Forrest Smithson,
110 m., 15 s.

F. W. Kelly,
120 yds., 15 1-5 s.

A. C. Kraenzlein,
220 yds., 23 3-5 s.

A QUARTET OF CHAMPION HURDLERS.

all of the injuries and the few fatalities attributed to football could have been avoided by using ordinary common sense such as I have indicated. Precisely as I pointed out in discussing the treatment of injuries among track athletes, the great majority of injuries in football can also be avoided by the use of care and common sense. No person should participate in a football game until he has been in training long enough for his muscles to be properly hardened and for his endurance to be well developed. Not only this, but a player should be taken out of the game when he is exhausted. It is at such times that nine-tenths of the injuries are received.

As long as football remains a game in which there is so much physical contact, those who play it will be subject to the usual number of minor injuries. If what I have said about physical condition is observed and the right kind of costume worn, most of these accidents can be prevented. I am a strong believer in plenty of padding, which should be placed beneath the suits rather than sewed on the outside.

Among the injuries attributed to football the most common, especially among young boys, is the wrenched or sprained ankle. It should always be attended to promptly, because the more the boy tries to work it off the longer time it will require to heal. When this injury is received the athlete should lie down at once, take off his shoe, and if there is any one present who knows how to strap an ankle with surgeon's plaster this should be done immediately. The plaster should be put on smoothly so that it will give the proper support to the ankle and bone. It is not necessary to have the plaster put on too tightly, but if it is done before the ankle has had a chance to swell it will heal much more quickly. The athlete should be taken home as quickly as possible and the foot rested by placing it on a pillow, the knee and ankle being slightly elevated. In case there is a throbbing pain the plaster should be slit where the folds are too tight. If it is impossible to have the ankle strapped at once it should be put in a tight supporting bandage until bedtime. Then the foot should be elevated a little and put on an ice-bag, or if this is not

available it should be wrapped in a wet cloth. Lead-water and laudanum is a very good solution to use, while a flannel cloth dipped in a solution of common Epsom salts will be found beneficial. In this condition the ankle needs plenty of rest, and the athlete should keep off his foot until the swelling has gone down. It will always be found that hot water is the best preliminary treatment for any kind of a wrench or sprain, and when the ankle is being bathed in hot water the leg should be kept elevated because it will more quickly reduce the swelling. The foregoing is the best method of treatment I know of for a sprained ankle, whether it is received in athletics or otherwise.

The most serious injury is the wrenched knee, and in the event of such an accident the athlete should lie down immediately so that he may have the proper rest. It should receive about the same treatment I have prescribed for the wrenched ankle, always bearing in mind that serious results may follow it if not immediately and properly attended to. Unless one has a very experienced trainer a doctor should be consulted at once. In the

meantime the knee should be strapped tightly with surgeon's plaster from two inches below the joint to at least four inches above. The knee should then be rested on a pillow with the leg slightly elevated. The strapping should begin and end at the hamstring muscles. If for any reason the knee cannot be strapped immediately, it should be bathed with plenty of hot water. Sufficient time should be taken for this because the more it is bathed the better. The hot-water application should be varied with an ice-bag put on the knee, or in the absence of an ice-bag a flannel cloth kept wet should be applied. Every precaution must be taken not to bend the knee. As soon as the swelling has gone the knee should be bound up again carefully. It will be very weak when first used, and at that time the slightest strain will injure it again. For the first few days crutches should be used, or if they cannot be secured a heavy cane will do. I would caution the athlete not to try to walk without first having the knee well bandaged. This will reduce the water upon the joint and at the same time give it a firm support. A rubber bandage worn for some

time after the injury will help the knee to regain its strength.

If one is a half-back or an end-rush he will have to guard continually against injury to the thigh. This results from a blow to the front side of the upper bone of the leg and becomes very painful if the muscle is hit often. Hot water is best for such a hurt, and at night a wet towel may be wrapped around the leg and tied with a bandage. One suffering from such an injury should under no circumstances attempt to play until the muscle is thoroughly healed. It is an injury exceedingly hard to treat because of the difficulty in making a bandage stay in place. A bandage of lint dipped in lead-water and laudanum or common Epsom salts is as good as anything I know of for such an injury. When the player returns to the game the leg should be well protected with padding inside the trousers.

Another injury hard to treat and guard against is that of the shoulder jumping out of place. Once this has happened to an athlete he must look for its return any time. In the course of my experience I have used every kind of brace or support known to prevent

this injury. Sometimes I have been able to carry a man through the season without its return, but when I did so it was purely luck. When the injury occurs a doctor should be secured to put the arm back into place; any other person would be likely to further injure it.

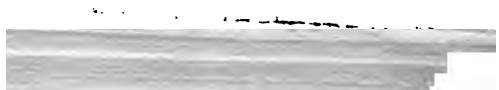
The best treatment for the arm is to wrap it in cotton lint dipped in lead-water and laudanum and to put it in a sling for four or five days. This will enable the arm to rest easily without the continual ache. For the bruised part on the top of the shoulder lead-water and laudanum should be used. Before this the shoulder should have been bathed with hot water; then a wet cloth covered with oiled paper should be applied to reduce the inflammation and keep the moisture in.

The arm should be given plenty of rest, and when the injury has healed enough to let the athlete start work again pads should be worn so that the sore spot will not be easily hurt. This can best be done by making a pad covered with leather.

In connection with what are usually known

FINISHED FORM FOR THE BROAD JUMP.

Frank Irons, Chicago A. A., winning Olympic championship at London, 1908. Observe how he uses his arms to get full distance.



as minor injuries and bruises, the athlete cannot be too careful. All bruised or skinned places should be cared for by cleaning them immediately and covering them with a clean gauze bandage. If the nose is skinned, as it frequently is in a scrimmage, the bruised part should be cleaned and covered with zinc ointment. The athlete should take the additional precaution of wearing a nose-guard for a few days. One should always beware of knocking a scab off because it is sure to cause a bad sore and leave a scar. For the same reason all sores should be carefully washed and kept free of dirt and other foreign matter. Many a case of blood-poisoning is due to carelessness in these details.

What I have said before about the dangers of overwork applies particularly to football. Inexperienced and ambitious coaches are usually responsible for this. In their desire to try out new plays, and worried by the fear of losing games, they forget that their players are human. Most football teams suffer from too much rather than too little work. Furthermore, nearly all injuries are received toward the end of practice and in the last period

of football games, at a time when the players are physically exhausted. The coaches should remember that one well man is worth two cripples.

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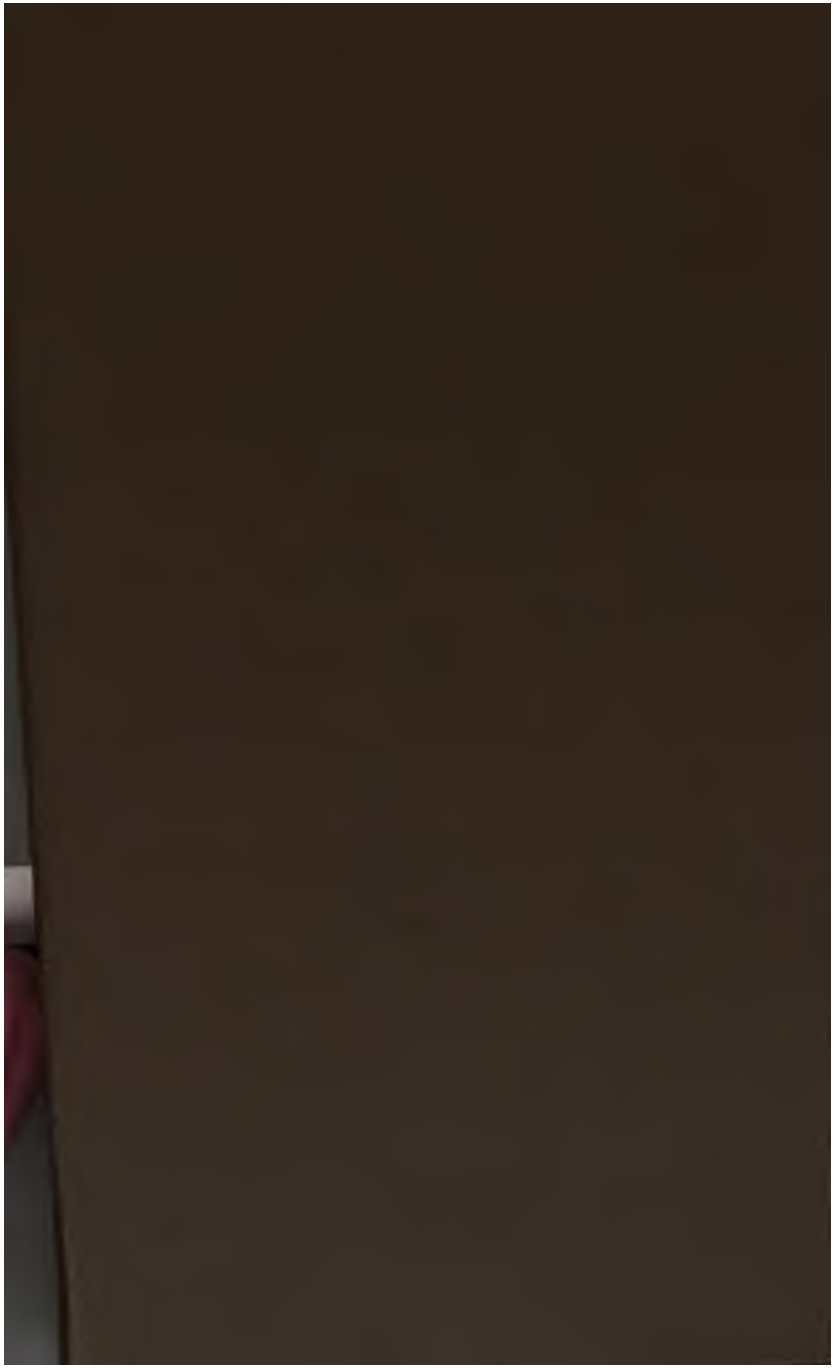
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